Editor's note: appeal filed Civ.No. 94-0432-S-EJL (D.Idaho, Sept. 28, 1994), aff'd on mining claim, remanded on millsite and EAJA, (Aug. 27, 1996); aff'd (on issue of remand for atty fees), Aug. 20, 1998, 154 F.3d 933; Petition for rehearing en banc filed with Circuit Court Oct. 19,1998.

UNITED STATES

v.

JAMES COLLORD AND MARJORIE COLLORD

IBLA 89-332 Decided March 10, 1994

Appeal from a decision of Administrative Law Judge Harvey C. Sweitzer declaring lode mining and millsite claims invalid and denying patent application. I-20886.

Affirmed in part and reversed in part.

1. Mining Claims: Determination of Validity--Mining Claims: Discovery: Generally--Mining Claims: Discovery: Geologic Inference--Mining Claims: Discovery: Marketability--Mining Claims: Marketability

   A lode mining claim contains a valuable mineral deposit if it has an exposure in a surface vein of a mineralized zone of relatively consistent high mineral values that, when justifiably projected to a depth of one-half its strike length, contains ore of sufficient quality and quantity that it can be extracted, removed, and marketed at a profit, taking into account the costs of setting up a mine and mill.

2. Mining Claims: Determination of Validity--Mining Claims: Discovery: Generally--Mining Claims: Discovery: Marketability--Mining Claims: Marketability

   Mineral deposits exposed on adjoining lode mining claims may be aggregated in order to determine whether a valuable mineral deposit is present on each claim. To be considered valuable, each deposit must contain ore of sufficient quality and quantity that a profit would be made after the costs of extracting, removing, and marketing are paid, to include a proportionate share of the expense of setting up a mine and mill.

3. Millsites: Determination of Validity--Mining Claims: Millsites

   Use of a millsite claim as a base of operations for prospecting and assessment work on an unpatented lode

mining claim and for storage of building materials to be used in connection with future mining and milling operations does not constitute compliance with the statutory requirement that a claimant use or occupy the claim for mining or milling purposes.

APPEARANCES: Jeffrey C. Fereday, Esq., James D. Hansen, Esq., Boise, Idaho, for appellants; James C. Weaver, Esq., McCall, Idaho, for the Idaho Conservation League; Erol R. Benson, Esq., and Joseph P. Stringer, Esq., Office of General Counsel, Forest Service, U.S. Department of Agriculture, Ogden, Utah, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE ARNESS

James Collord and Marjorie Collord have appealed from a February 23, 1989, decision of Administrative Law Judge Harvey C. Sweitzer declaring the Golden Bear Nos. 1 and 2 (GB-1 and GB-2) lode mining claims (I MC-19994 and I MC-19993) invalid for lack of a discovery of a valuable mineral deposit and declaring the Lost Dutchman and Golden Bear millsite claims (I MC-19995 and I MC-19996) invalid because neither was being used or occupied for mining or milling purposes in connection with a valid mining claim. Judge Sweitzer also denied a pending patent application for those claims. We reverse Judge Sweitzer as to the GB-1 claim, but affirm his decision as to the GB-2, Lost Dutchman, and Golden Bear claims.

On September 1, 1979, James Collord and E. James Collord located the GB-1 and GB-2 lode mining claims and the Lost Dutchman and Golden Bear millsite claims in unsurveyed secs. 5, 7, and 8, T. 21 N., R. 11 E., Boise Meridian, Valley County, Idaho, within the Payette National Forest. They asserted thereby that each of the mining claims was supported by the discovery of a valuable deposit of gold, silver, or other precious metals and that the millsite claims were being used or occupied for mining or milling purposes in connection therewith. A mineral survey (No. 3654 A & B) was completed in August 1982 and approved by the Bureau of Land Management (BLM) on January 5, 1983. James Collord and Marjorie Collord subsequently acquired title to the claims and made amended locations on October 3, 1984, and January 3 and February 21, 1985. An application seeking patent to the claims (I-20886) was filed on May 24, 1984, and amended December 10, 1984. Following payment of the required purchase money, BLM issued a "Mineral Entry Final Certificate" on June 26, 1985, with patent to issue upon verification of the discovery of a valuable mineral deposit. Issuance of a patent was delayed pending a determination by the Forest Service, U.S. Department of Agriculture, whether a valuable mineral deposit had been discovered on each of the mining claims.

On February 25, 1987, BLM, on behalf of the Forest Service, filed a contest complaint, alleging that minerals were not found within the lode mining claims in sufficient quality and quantity to constitute a valuable mineral deposit, either on the date of the first Forest Service mineral examination (June 20, 1985) or when the land was withdrawn from mineral

entry (January 1, 1984). The land was withdrawn from appropriation under the mining laws, subject to valid existing rights, by establishment of the Frank Church-River of No Return Wilderness, pursuant to section 3 of the Central Idaho Wilderness Act of 1980, P.L. 96-312, 94 Stat. 948 (1980). The complaint alleged that the millsite claims, also located within the wilderness area, had no quartz mill or reduction works and were not needed or used or occupied for mining or milling purposes in connection with a valid mining claim. The Collords admitted in their answer that the millsite claims did not contain a quartz mill or reduction works, but otherwise denied all of the allegations of the complaint.

A hearing was held before Judge Sweitzer on June 20, 21, and 22, and July 13, 14, and 15, 1988, in Boise, Idaho. In his February 1989 decision, he declared the lode mining claims invalid, finding that the evidence produced at the hearing was not sufficient to show discovery of a valuable mineral deposit on either of the claims, at either the time the final certificate was issued in the patent proceedings or on the date of withdrawal. Although he found that a vein yielding "fairly consist[ent] high values of gold on the surface" extended across both claims, he concluded there was insufficient evidence regarding the extent of the vein at depth and whether the values continued to depth (Decision at 10, 24). He declared the millsite claims invalid because they were not associated with a valid mining claim and were not being used for mining or milling purposes in connection therewith. He denied the pending patent application. This appeal was then taken.

[1] In order to be valid so as to be subject to patent, a mining claim must contain, within its boundaries, a "valuable mineral deposit." 30 U.S.C. § 22 (1988). See 30 U.S.C. § 29 (1988); Best v. Humboldt Placer Mining Co., 371 U.S. 334, 335 (1963). Such a deposit consists of a deposit of minerals of such quality and quantity as to warrant a person of ordinary prudence in the further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine. Chrisman v. Miller, 197 U.S. 313, 322 (1905). Further, a mineral deposit will be considered valuable where there is a reasonable likelihood that the value of the deposit exceeds the costs of extracting, transporting, processing, and marketing it. United States v. Coleman, 390 U.S. 599, 600, 602-03 (1968); In Re Pacific Coast Molybdenum Co., 75 IBLA 16, 29, 90 I.D. 352, 360 (1983). A deposit of sufficient size and value need not be "blocked out." United States v. Hooker, 48 IBLA 22, 30 (1980); United States v. Pressentin, 71 I.D. 447, 451 (1964), aff'd, Pressentin v. Udall, No. 1194-65 (D.D.C. Mar. 19, 1969). Nor must the deposit be actually mined and milled at a profit or the profitability of mining and milling that deposit be guaranteed. Barton v. Morton, 498 F.2d 288, 289, 291-92 (9th Cir.), cert. denied, 419 U.S. 1021 (1974); Barrows v. Hickel, 447 F.2d 80, 82 (9th Cir. 1971); United States v. Mannix, 50 IBLA 110, 117, 119 (1980); United States v. Hooker, supra at 29. In the case of land withdrawn from mineral entry and the subsequent issuance of a final certificate by BLM, a valuable mineral deposit must be shown to exist on the dates of withdrawal and of issuance of the certificate. United States v. Whittaker (On Reconsideration), 102 IBLA 162, 166 (1988), aff'd, Whittaker

v. United States, No. CV-87-140-GF (D. Mont. Feb. 8, 1989); United States v. Hooker, supra at 29.

When the Government contests a mining claim because it is not supported by the discovery of a valuable mineral deposit, it must make a prima facie case that no discovery exists, whereupon the burden shifts to the claimant to establish by a preponderance of the evidence that a discovery exists as to those matters placed in issue by the Government. United States v. Springer, 491 F.2d 239, 242 (9th Cir.), cert. denied, 419 U.S. 834 (1974); United States v. Hooker, supra at 26-27. The ultimate burden of proof of these matters rests with the claimant. United States v. Taylor, 19 IBLA 9, 22-23, 82 I.D. 68, 73 (1975). As the Board observed in Taylor: "[A]ny doubt on the issue of discovery raised by the evidence must be resolved against the mining claimant, who bears the risk of nonpersuasion. * * * Where the claimant has failed to meet his burden of proof on discovery, the Judge must find that there has not been a discovery." Id. at 24-25, 82 I.D. at 74. If the claimant overcomes the Government's prima facie case, the contest would ordinarily be dismissed. See United States v. Lewis, 58 IBLA 282, 289-90 (1981); United States v. Taylor, supra at 25, 82 I.D. at 74. But where a patent application is pending the Judge is bound to resolve all questions regarding the validity of the mining claim presented to him. United States v. Hooker, supra at 27; United States v. Pittsburgh Pacific Co., 30 IBLA 388, 392-93, 84 I.D. 282, 284-85 (1977), aff'd sub nom., State of South Dakota v. Andrus, 462 F. Supp. 905 (D.S.D. 1978), aff'd, 614 F.2d 1190 (8th Cir. 1980). On appeal, the Board will decide these questions either de novo or, in the absence of sufficient factual evidence, by referring the case back to the Judge for rehearing and another decision (that will again be subject to appeal). See Hallenbeck v. Kleppe, 590 F.2d 852, 860 (10th Cir. 1979); United States v. Rigg, 16 IBLA 385, 389 (1974); United States v. Taylor, supra at 25-26, 82 I.D. at 74.

In this case, there is little question that a well-defined quartz vein containing gold ore 1/ extends lengthwise through the GB-1 and GB-2 mining claims, which are placed end-to-end in a northwest-southeast direction along a steep, rocky hillside, from 400 to 1,400 feet above the Lost Dutchman millsite claim. The vein outcrops at numerous points along its total length. There are two major areas (described by the Forest Service as Blocks I and II), separated by an "unnamed drainage," where outcropping occurs. See Tr. 205; Exhs. 92 and 93. The western portion (Block I) outcrops a distance of about 464 feet at various points on both the GB-1 and GB-2 claims and the eastern portion (Block II) outcrops about 207 feet on the GB-2 claim. See Exh. 59 at 3; Exh. G at 9; Exh. 73A at 12, 25. 2/ The total length and width of the vein are fairly well established. The Forest Service and the claimants were agreed that it likely runs a total distance

1/ The word "ore" is used in this decision to mean rock that contains gold. See Tr. 121, 958.
2/ Exhibit page number citations refer to page numbers appearing in the exhibit itself.

of 1,287 feet (763 feet in the case of Block I and 524 feet in the case of Block II) and is from several inches to 5 feet or, on average, 2 feet wide. See Tr. 724, 884-86, 899, 905-06, 911, 915-16, 1040-41; Exh. 16 at 1; Exh. 35 at 2; Exh. 49 at 2; Exh. 59 at 3; Exh. 73A at 12, 21, 22, 25. While the vein is not evident in the unnamed drainage, Carol J. Thurmond, the principal Forest Service mineral examiner, admitted that it may simply be covered by overburden. See Exh. G at 9. Despite her suggestion to the contrary (see Exh. 73A at 12), the preponderance of the evidence establishes that the vein is not sheared, chloritized, faulted, fractured, gouged, or otherwise altered as it passes through the Collord claims. 3/ See Tr. 168-69, 225, 729, 733, 735, 839-40, 883, 891-92, 893-94, 897-99, 908-10, 999, 1042-43; Exh. 49 at 2-3; Exh. 59 at 3.

The depth of the vein is problematic since it has not been discerned by underground workings, drilling, or other means. See Tr. 1134-35; Exh. 66A at 5. Several 2- to 8-foot deep pits dug at points along the course of the vein were not deep enough to reveal the overall depth of the vein. See Tr. 826-27, 1230; Exh. 59 at Table 2. In this situation, geologic evidence may be used to reasonably project a surface exposure to depth. 4/ United States v. Dresselhaus, 81 IBLA 252, 268 (1984); United States v. Feezor, supra at 71, 90 I.D. at 270; United States v. Hooker, supra at 30; United States v. Larsen, 9 IBLA 247, 261-62 (1973), aff'd, Larsen v. Morton, No. 73-119 Tucson (JAW) (D. Ariz. Sept. 24, 1974); United States v. Harenberg, 9 IBLA 77, 83 (1973). In calculating ore reserves on the two mining claims, all the experts agreed on a "rule-of-thumb" that the depth of a vein is at least one-half the length of the vein (or its "strike"). See Tr. 1130-31; Exh. 73A at 21; Exh. 49 at 4; Exh. 59 at 8. They all testified that this is a commonly accepted practice. See Tr. 142-43, 187, 314, 742, 935-36. In spite of this unanimity of opinion, Judge Sweitzer concluded that there was insufficient geologic evidence to reasonably project the vein to depth, thereby discounting the accepted "rule-of-thumb." Decision at 12, 23-24. On appeal the Forest Service disclaims reliance on the rule.

We find no evidence in the record that this rule was not properly applied to the Golden Bear vein. Rather, we find evidence that supports its use, since the vein, which can be projected to a depth of from 74 to 644 feet using the "rule-of-thumb," has been shown, by geologic evidence,

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3/ Her conclusion that the vein was altered was not based on a detailed survey of the vein on the ground, but by analogy to veins generally in the Ramey Ridge area. See Tr. 168-69; Exh. G at 9.

4/ To determine the depth of a vein and any embedded mineral deposit by geologic inference, it is not sufficient to classify the ore reserve within a vein as either measured, indicated, or inferred (or proven, probable, or possible). See United States v. Feezor, 74 IBLA 56, 84, 90 I.D. 262, 277-78 (1983), vacated in part on other grounds and remanded, 81 IBLA 94 (1984). Rather, the focus must be on the presence or absence, as well as the reliability, of geologic evidence supporting the inference of depth. See United States v. Hooker, supra at 36.

to have a depth of from 80 to 500 feet. See Tr. 936. The vein has been actually exposed to a depth of from 2 to 8 feet at various points along its length. See Tr. 826-27, 886-87, 1067-68, 1230; Exh. 59 at 8; Exh. 88; United States v. Harenberg, supra at 83. Both Wayne R. Kemp, an economic geologist employed by the Collords, and S. Morris Hubbard, a geologist similarly employed by the Collords, point to the relatively consistent nature of the vein and the surrounding wall rock along the vein's entire length as indications that the vein likely goes to great depth. See Tr. 724, 729, 733, 882-86, 888, 890-92, 895-96, 898-99, 908, 911-12, 916-17, 934, 1011-12, 1013-14; Exh. 49 at 2-3; Exh. 59 at 3, 6-7, 8. There is no indication that the vein would not continue to depth. See Tr. 897-99, 908-10, 934, 999, 1041; Exh. 59 at 4, 8. Geologic inference may be based on a knowledge of the geology of the area. United States v. Arizona Mining & Refining Co., 27 IBLA 99, 104 (1976); United States v. Larsen, supra at 262. Further, the vein has been observed outcropping at several elevations along its course, indicating a depth of from 80 to 200 feet. See Tr. 645-46, 770-71, 846-47, 889, 897-98, 1069; Exh. 59 at 8; Exh. 66A at 18; Exh. 73A at 22; Exh. 88. And there is evidence that a drift that has since caved-in had entered a vein on line with the Golden Bear vein 300 feet below the surface exposure of that vein. See Tr. 789-93; Exh. 77B. Kemp and Hubbard also testified about similarities between the Golden Bear vein and the Snowshoe vein located about 3.7 miles to the northwest. That vein, which displays similar mineralization, strike length and width, and physical orientation, was successfully mined to a depth of 500 feet. See Tr. 744, 919-24; Exh. 66A at 8. The extent of an ore body can be demonstrated by proof of similar deposits on nearby or geologically related areas. United States v. Larsen, supra at 262. None of this evidence was refuted by the Forest Service. See Tr. 1223.

Extensive sampling has been undertaken along the course of the vein, at both outcrop points and in pits, by both the Government and claimants. 5/ Neither party disputes the sampling undertaken by the other. Seventeen samples were taken by E. James Collord in 1981 by chipping across the vein, attempting to include rock on both the hanging and foot wall. See Tr. 1029, 1031, 1036-37; Exh. 97. In June 1985, Thurmond and Hubbard each took 13 samples at 12 locations by cutting a channel across the vein. See Tr. 725; Exh. 49 at 3; Exh. G at 13; Exh. 73A at 17. In addition, Thurmond collected seven samples of wall rock and vein material at some of the previously sampled sites in September 1986 and took three grab samples of vein material in July 1987. See Tr. 131-32, 133-35. All of the samples were fire assayed. This sampling revealed some significant gold values as shown by exhibits 6, 73A at Appendix B, 49A, H, and I, summarized in Appendix I attached hereto. 6/ In the case of the GB-1 claim, the samples exhibited

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5/ Sampling done in 1966 by the Bureau of Mines, U.S. Department of the Interior, revealed from a trace to 1.18 oz./ton of gold in the Golden Bear vein. See Exh. 73A at 8.

6/ Splits of Thurmond's 13 samples were separately assayed at the request of Raymond R. Wallace, a senior Forest Service mining engineer, and the results appear in Exhibit K. See Tr. 354-55. The results were not

gold values in the vein of from a trace to 4.185 oz./ton, or an average of 0.85 oz./ton. For the GB-2 claim, the samples showed gold values in the vein of from a trace to 0.675 oz./ton, or an average of 0.14 oz./ton. We therefore find that there has been exposed on the claims a vein or lode carrying mineral values so as to meet the threshold requirement of the mining law. See United States v. Feezor, supra at 74, 90 I.D. at 272.

In addition, Kemp took bulk samples from the higher-grade zones (or "oreshoots") in both claims in August 1986. See Tr. 977, 979; Exh. 59 at 1, 4. Composite samples taken from sites F and G within the GB-1 claim and from sites I and K within the GB-2 claim revealed gold values of 1.125 and 0.34 oz./ton. See Tr. 980, 986-88; Exh. 59 at 5; Exh. 61 at 3, 4; Exh. 92. In order to assess the accuracy of these results, Kemp compared them to weighted averages of the samples taken by E. James Collord, Thurmond and Hubbard at these sites: 2.241 oz./ton (sites F and G) and 0.343 oz./ton (sites I and K). See Tr. 984; Exh. 61 at 4. According to Kemp, the larger bulk samples reflect better than the chip samples the true mineralization found in the Golden Bear vein at any point, since they account for the irregular nature of gold deposition. See Tr. 925-26, 978; Exh. 59 at 7; Exh. 61 at 1-2. This evidence establishes the existence of two principal ore bodies on the two mining claims, characterized as the "high" and "medium" grade ore bodies. See Tr. 926-27, 931-33; Exh. 59 at 7; Exh. 61 at 3-5. High-grade ore consists of ore averaging at least an ounce of gold per ton, while medium-grade ore averages at least 0.3 ounces of gold per ton. See Exh. 59 at 7; Exh. 61 at 3. The high-grade ore body is found on the GB-1 claim, while the medium-grade ore body is located on the GB-2 claim. See Tr. 937, 938, 977, 979; Exh. 59 at 7. Kemp concluded that the bulk sample results constituted the minimum values of the higher-grade zones. See Tr. 986-88; Exh. 61 at 4, 5, 6.

At first, the Forest Service concluded that there were two principal ore bodies on the subject claims, comprising Blocks I and II. In her February 1986 Report (Exh. 73A), that was approved by Wallace in March 1986, Thurmond calculated that Block I (encompassing sample sites A and D through K) contained 44,215 tons of ore. 7/ See Exh. 73A at 22, 23. This calculation assumed a length of 763 feet (strike length), a projected depth of 382 feet (one-half the strike length), and varying widths along the course of the vein. See Exh. 73A at 21. A tonnage factor of 12.5 was applied to convert cubic feet to tons. Thurmond then determined that Block II (encompassing sample sites N through P) contained 16,395 tons of ore, given a total length of 524 feet, a projected depth of 262 feet, and varying widths.

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fn. 6 (continued)
considered to be significantly different from Thurmond's reported assay results by either Thurmond or Wallace. See Tr. 1200-01, 1236.

7/ The Forest Service was informed in June 1985 that the claimants intended to mine only the area encompassing sample sites A and D through K. See Tr. 124, 262; Exh. F at 1.

See Exh. 73A at 21, 22, 23. Using 1983 and 1986 gold prices, Thurmond determined the value of each block of ore, using all gold values obtained at sample sites A and D through K (Block I) and N through P (Block II). See Exh. 73A at 20, 21, 23, 24. Block I was valued at $7.4 million or $167.42/ton (1983) and $6.4 million or $144.79/ton (1986), and Block II at $490,681 or $29.93/ton (1983) and $425,282 or $25.94/ton (1986). See Exh. 73A at 23, 24. Thurmond revised her February 1986 calculations in an October 1986 Report (Exh. G), approved by Wallace in November 1986, that decreased ore reserve estimates to 18,629 tons for Block I and 2,963 tons for Block II. See Exh. G at 16. The decrease was made because Thurmond then saw Blocks I and II as being 464 and 207 feet in exposed strike length, and she consequently projected depths of 232 and 104 feet (one-half the strike length) for each block. See Tr. 230-32, 1209-10; Exh. G at 16; Exh. 93. She attributed the reduction in length to pinch-and-swell characteristics of the vein that presumably might truncate it. See Tr. 233-34, 235; Exh. 93. She also reduced overall tonnage by 20 percent because the ore reserves are probable and to further account for pinch-and-swell characteristics. See Tr. 238-42, 1218-19; Exh. G at 15; Exh. 81 at 38; Exh. Q at 483, 485. Consequently, she substantially reduced values for the two blocks.

How her estimate of ore reserves failed, however, was that she included portions of the vein that held low or no gold values without evidence that it would be advantageous to mine such material. 8/ This made it likely that neither of the claims would be considered to contain a valuable mineral deposit since it assumed that the claimants would extract ore from these portions, at considerable cost, with no expectation of a profitable return. No prudent miner would do so. See Tr. 941-44, 951, 1048-49; Exh. 64 at 4-5; Exh. 66A at 6; Memorandum to the Files from R.J. Thompson, Western Field Operations Center, Bureau of Mines, dated Oct. 23,
1990 (Thompson Report) at 11. 9/ Thurmond and Wallace agreed. See Tr.

8/ Hubbard also contemplated mining a single ore body within the vein encompassing sample sites A and D through K, thereby obscuring the more significant higher-grade ore bodies contained therein. See Exh. 49 at 4 and Table 1.

9/ A copy of the Thompson Report was filed with the Board on Dec. 31, 1990, after the conclusion of the hearing and issuance of Judge Sweitzer's decision. The report contains results of additional sampling and testing done in July 1990 at the mining claims and a further analysis of the profitability of mining operations. The claimants seek to have the Board consider the report. At this stage in the proceedings we would normally consider only whether the hearing should be reopened for the purpose of receiving the report into evidence. See United States v. Whittaker (On Reconsideration), supra at 164. We are not persuaded to do so. No explanation has been provided for the failure to generate this report prior to or at the time of the hearing, so that it could have been introduced at the hearing. Nor would the report change the result reached by this decision. Nonetheless, it is a public record of the Department and we take official notice of it under 43 CFR 4.24(b).

259-61, 326. Since the standard by which we must judge whether a valuable deposit has been found on either claim is whether a person of ordinary prudence would have a reasonable expectation of mining at a profit, we must focus on what a prudent miner would do to obtain a maximum return and then judge whether this is sufficient to satisfy the "prudent man/marketability test." Since the standard is objective, it does not depend on what the claimants actually planned to do. See United States v. Coleman, supra at 602; United States v. Rice, 73 IBLA 128, 140-41 (1983); United States v. Harper, 8 IBLA 357, 369-70 (1972). In applying the prudent man/marketability test, we will assume 'proper management' of the mining venture. Converse v. Udall, 399 F.2d 616, 623 (9th Cir. 1968), cert. denied, 393 U.S. 1025 (1969) (quoting from United States v. Santiam Copper Mines, Inc., A-28272 (June 27, 1960) at 4); United States v. Pressentin, supra at 451.

When Kemp estimated the likely recovery from mining the subject mining claims, he properly concentrated on those portions of the vein identified by him as containing high- and medium-grade mineralization. See Tr. 951-52. We will also focus on these ore bodies to ascertain whether a valuable mineral deposit is to be found on either of the claims. Kemp calculated that the high-grade ore body (containing at least an ounce of gold per ton) was 148 feet long (the combined length of the "zones of influence" of sample sites E through G 10/), 2.1 feet wide (the average width reported by the Forest Service), and 644 feet deep (one-half the total length of the vein). See Tr. 931-32, 937. Using the same tonnage factor as the Forest Service (12.5), Kemp determined that the ore body contained 16,000 tons. See Tr. 937-38. Similarly, he determined that the medium-grade ore body (containing at least 0.3 ounces of gold per ton) contained 18,284 tons, using a length of 169 feet (the length of the "area of influence" of sample site K 11/), a width of 2.1 feet, and a depth of 644 feet. See Tr. 938-

10/ These zones of influence were accepted by Wallace and Thurmond. See Tr. 255-56, 323; Exh. 73A at 21; Exh. 93; Exh. 108 at 3. This accords with the rule stated in the Montana "Handbook for Small Mining Enterprises" (Earll, et al., March 1976) (Handbook) that the "area of influence of a sample extends both ways from the sample location halfway to the next sample location." See Exh. 81 at 37.

11/ Thurmond initially accepted a zone of influence of 259 feet, by extending the area of influence of sample site K halfway to sample sites J and N. See Tr. 255-56; Exh. 73A at 21; Exh. 93. So did E. James Collord. Exh. 66A at 21. Wallace assumed a zone of influence of 51 feet. See Tr. 323-24; Exh. 108 at 3. He did so, however, by assuming that the influence of sample site K extends the same distance east to sample site N as it does west to sample site J. See Tr. 323-24; Exh. 93. We can find no foundation for this assumption. Rather, in the absence of evidence that the mineralized vein does not extend between the outcrop points (see, e.g., Tr. 446-47), we accept Kemp's approach, consistent with the Handbook rule, that extended the influence of sample site K halfway to sample site J and halfway to sample site M, the next sample site to the east.

39. 12/ According to Kemp, the consequence of mining the high-grade ore body would be to recover 80 percent of the anticipated recovery of gold from the entire vein (as estimated by the Forest Service), but without the need to mine and mill 75 percent of the low- or no-grade ore, thereby reducing overall mining and milling costs. See Tr. 972-75; Exh. 64 at 2, 5. Mining both the high- and medium-grade ore bodies would result in the recovery of 90 percent of the overall anticipated recovery from 35 percent of the total number of tons of ore in the vein. See Thompson Report at 11, 15.

The problem with Kemp's estimate of valuable ore reserves is that it assumes a depth based on one-half the total length of the Golden Bear vein. A similar error was made by E. James Collord in his reserve calculations because he determined the tonnage of a high-grade ore body (Block A), encompassing sample sites E through G, and a medium-grade ore body (Block B), encompassing sample site K, within the vein, by taking one-half the length of the Forest Service's Block I, encompassing sample sites A and D through K (763 feet). See Exh. 66A at 14-15, 23. Logically, however, the depth must be confined to one-half the length of each of the discrete higher-grade ore bodies since there is no evidence that these bodies extend the entire length of the vein. See Tr. 897, 1130-31 (rule-of-thumb used to calculate "probable extension of an individual oreshoot in depth"). While these ore bodies may in fact extend the length of the vein, in the absence of any subsurface sampling, we will project them to depth only to the extent that they can be

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12/ E. James Collord also focused on the high- and medium-grade mineralized zones in the two mining claims, situated in the area of sample sites E through G and sample site K. He concluded that the GB-1 claim contains a body (Block A) of high-grade ore (1.391 oz./ton) containing 7,747 tons and that the GB-2 claim contains another body (Block B) of medium-grade ore (0.418 oz./ton) containing 16,621 tons. See Exh. 66A at 6-7, 14-15. He separated these deposits since "all other vein material is below cut-off grade and is considered waste." See Exh. 66A at 14. Block A would be valued at $4,111,073.30, or $530.67/ton, in January 1984 and $3,563,217.60, or $459.95/ton, in June 1985, while Block B would be valued at $2,650,501, or $159.47/ton, in January 1984 and $2,297,286.10, or $138.22/ton, in June 1985. Assuming a mine dilution of 10 percent, an 85-percent mill recovery, a 95-percent custom mill recovery, and custom milling costs of 7.5 percent, there is a final recovery of $356.74/ton in January 1984 and $309.20/ton, in June 1985, for Block A, and $107.20/ton, in January 1984 and $92.92/ton, in June 1985, for Block B. While mining and milling operations on the GB-1 claim would show a profit after payment of the costs of operations on that claim alone ($270.25/ton) or on both claims ($180.08/ton), such operations with respect to the GB-2 claim would show a loss after payment of either the costs of operations on that claim alone ($224.72/ton) or on both claims. Recovery in the case of the GB-2 claim would barely exceed principal operating costs ($106.44/ton) in January 1984 and would not exceed them in June 1985.

observed on the surface. This was the approach adopted by Robert C. Sykes, a Forest Service mining geologist. See Tr. 438; Exh. 16 at 1. To do otherwise would be to substitute sheer speculation for reasonable geologic inference.

We have therefore determined that the high-grade body contains 1,696.63 tons of ore, using the lengths of the zones of influence of each of sample sites E (41 feet), F (65 feet), and G (49 feet), an average width for each of the sites (E - 2.78 feet; F - 0.7 feet; G - 2.33 feet), and a depth based on one-half the total strike length of the three zones of influence (77.5 feet). This is close to the finding made by Wallace. See Tr. 346, 349, 350 (1,800-ton high-grade ore body). Similarly, we have determined that the medium-grade body, encompassing sample site K, contains 2,603.39 tons of ore by using a length of 172 feet, an average width of 2.2 feet, and a depth of 86 feet. The claimants do not dispute the existence of these higher-grade ore bodies. See Tr. 964 ("[E]very time you shrink reserves you * * * tend to make it more positive * * * that material really is there").

We are not persuaded that the Golden Bear vein exhibits pinch-and-swell characteristics, since there is no evidence that it pinches out or splits into narrow stringers. See Tr. 417-18, 644-45, 915, 990-91, 1042-43; Exh. 59 at 3; Exh. 66A at 2; A Dictionary of Mining, Mineral, and Related Terms 822 (Bureau of Mines 1968) ("pinch"). Thurmond's definition of a pinch-and-swell vein as one that varies in width (see Tr. 233) leaves intact her other conclusion regarding the average width of the vein. Moreover, we cannot say that the dimensions of the smaller higher-grade ore bodies are other than as conservatively estimated here. See Exh. 66A at 2. There is no need, therefore, to further reduce the tonnage of these bodies in order to account for the probability that they do not contain the projected tonnage. See Tr. 953-55, 1051-52; Exh. 64 at 7; Exh. 81 at 39 ("Some estimators prefer to handle the problem of probability at an earlier stage by drawing the margins of ore blocks less optimistically in the first place"); Thompson Report at 11. As a consequence, we cannot adopt the 20-percent reduction in ore reserves made by Thurmond. See Exh. G at 15.

Each of the higher-grade ore bodies is presumed to continue gold values detected on the surface. As we indicated in United States v. Feezor, supra at 78-79, 90 I.D. at 274-75, relatively consistent values observed in surface exposures of a vein may be reasonably projected throughout the inferred depth of the vein. See also United States v. Chambers, 47 IBLA 102, 107 (1980). Such relatively consistent values are evident here through that part of the vein containing the higher-grade ore bodies. See Tr. 912-15, 986-88, 1014, 1038; Exhs. 6, 73A at Appendix B, 49A, H, I, and K. Assays of samples taken from the main vein material in place showed the high- and medium-grade ore bodies exhibit average gold values of 1.72 and 0.412 oz./ ton. Judge Sweitzer also concluded that there were "fairly consist[ent] high values of gold on the surface" (Decision at 10). We therefore conclude that the 1,696.63 and 2,603.39 tons of ore found in the valuable ore bodies in the GB-1 and GB-2 claims will, since they exhibit gold values

of 0.675 oz./ton at sample site E, 1.98 oz./ton at sample site F, and 2.51 oz./ton at sample site G on the GB-1 claim and 0.412 oz./ton at sample site K on the GB-2 claim, contain a total of 2,812.27 (GB-1) and 1,072.60 (GB-2) ounces of gold. 13/ The total value of each of the deposits can be determined by multiplying the total number of ounces in each ore body by the value of an ounce of gold in January 1984 and June 1985. 14/ The total is $1,072,881.00, or $632.29 per ton, in January 1984 and $929,905.19, or $548.09 per ton, in June 1985, for the GB-1 claim, and $409,196.90, or $157.18 per ton, in January 1984 and $354,665.91, or $136.23 per ton, in June 1985, for the GB-2 claim.

Assuming that the resuing mining method proposed by the claimants will be used to remove the ore from the claims, the value of the ore will be diluted to some extent by unavoidable removal of some waste. We are not persuaded to accept either the 50- or 25-percent dilution factors proposed by the Forest Service, however, since they either assumed use of shrinkage stoping mining methods or were not shown to be applicable to the deposits at issue here. See Tr. 246, 326-29, 416-17, 420, 421, 1001-02; Exh. 73A at 21, 26, 30; Exh. G at 17. The preponderance of the evidence establishes there would be minimal dilution on the order of 10 percent given the showing that the vein material can, by the resuing method, be severed cleanly from the wall rock. See Tr. 626-28, 729, 883, 892-93, 963, 1043, 1053, 1077; Exh. 66A at 9; Exh. P at 476. Further, we accept that the ultimate recovery of gold from the ore will be 85 percent (rather than 75 percent as estimated

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13/ To find the amount of gold in the higher-grade ore bodies, we take averages of all of the samples taken at each of sites E through G (GB-1) and site K (GB-2), excluding samples not taken from the main vein material in place (i.e., samples taken in whole or in part from the foot wall and the hanging wall and grab samples). All of the samples taken together constitute bulk sampling of each section of the vein. See Tr. 369, 983-84; Exh. 61 at 6. The values so obtained compare favorably to the results of bulk sampling of the higher-grade ore bodies undertaken by Kemp. See Exh. 59 at 5.

14/ The record demonstrates that gold was selling for $381.50/oz. when the subject land was withdrawn from mineral entry (Jan. 1, 1984). See Tr. 1093-94; Exh. 73A at Appendix C. Gold prices subsequently declined to $316.49/oz. in June 1985, when the final certificate issued. See Exh. 73A at Appendix C; see also Exh. 49 at 1 (July 1985 gold price - $320/oz.). At that time, the average gold price since May 1984 was $332.41/oz. See Exh. 73A at Appendix C. But after June 1985 the price of gold climbed slowly to $345.49/oz. in January 1986 and eventually to $439.10/oz. in July 1988. See Tr. 1093; Exh. 73A at Appendix C. It is proper to consider the historic range of prices in order to account for market fluctuations. United States v. Crowley, 124 IBLA 374, 375 (1992). Therefore, in the course of this opinion, we will rely on the Jan. 1, 1984, price and the average price for the period from May 1984 to January 1986 ($330.66/oz.) as representing the immediate historic period surrounding issuance of the final certificate in June 1985. See Exh. 73A at Appendix C.

by the Forest Service) since that figure is supported by actual testing of the subject or similar ore. See Tr. 138-39, 252, 253-54, 423-24, 479-80, 642-43, 1153; Exh. 43 at 6; Exh. 66A at 11; Exh. 73A at 27; Thompson Report at 10; United States v. American Independence Mines & Minerals, 122 IBLA 177, 187, 188 (1992). 15/ This reduces the value of the ore deposit to $483.70 per ton (January 1984) and $419.29 per ton (June 1985), for the GB-1 claim, and $120.24 per ton (January 1984) and $104.22 per ton (June 1985), in the case of the GB-2 claim.

The costs of mining and milling the ore from the higher-grade ore deposits on the two mining claims must be considered. Costs estimated by the Forest Service, however, were for a larger and longer operation because the Forest Service assumed that the two principal ore bodies on the claims, referred to as Blocks I and II, would be mined out. In her February and October 1986 mineral reports, Thurmond assumed removal of 44,215 or 18,629 tons of ore (plus 49,056 or 22,353 tons of waste) from Block I, and that 16,395 or 2,963 tons of ore (plus 27,538 or 7,386 tons of waste) would be taken from Block II, for a total of 230,295 or 51,331 tons of ore and waste. See Exh. 73A at 23, 24; Exh. G at 16. Thurmond presumed that the entire deposit would be mined over a 69- or 25-year period (given the claimants' projected annual production of 875 tons of ore, see Exh. 66A at 9). Wallace assumed the mining of 23,065 tons of ore and 26,861 tons of waste from Block I over a period of 17.4 years. See Tr. 342; Exh. 108 at 1, 3. At a production rate of 875 tons of ore per year, the life of such a mine would be 26.4 years. Neither Thurmond nor Wallace considered mining just the higher-grade ore bodies. See Tr. 349. Clearly, however, in this case we must consider a shorter mining operation, involving the removal of 1,696.63 and 2,603.39 tons of ore (plus 169.66 and 260.34 tons of waste) from both claims, for a total of 1,866.29 and 2,863.73 tons of ore and waste. To begin with, E. James Collord projected a 13-year mine life needed to mine 24,369 tons of ore. See Tr. 1098; Exh. 66A at 10, 15, 24. He later revised that estimate to conclude that the high-grade deposit on the GB-1 claim could be mined in 2.1 years. See Tr. 1126; Exh. 119 at 2. In actuality, it would be 1.9 years. A correspondingly short mine life (3.0 years) can be projected for the medium-grade deposit on the GB-2 claim. By so evaluating mining and milling costs, we will focus on the smaller mining operation envisioned here. See United States v. American Independence Mines & Minerals, supra at 187.

A prudent miner would mine the ore on the two adjoining claims by underground methods. A drift would be run from an outcrop 150 feet to the portion of the vein containing the high-grade ore deposit in the GB-1 claim, taking the "shortest possible path to the vein" (Tr. 1008), and then 155 feet along the course of the vein. See Tr. 1125. The drift would then continue along the vein 128 feet to the medium-grade ore deposit in the GB-2

15/ American Independence involved similar lode mining claims located in the Payette National Forest, a short distance from the subject claims. The only apparent difference between these cases is that the quartz veins in American Independence would be mined by the open pit method.

claim and then 172 feet along that portion of the vein. See Tr. 1097; Exh. 66A at 10. There is no evidence that these distances are in error. In addition, a single 77.5-foot-long raise would be run from the drift in the GB-1 claim. 16/ See Tr. 1125.

Thurmond calculated the costs of running drifts and raises at a uniform rate of $84 per foot. See Exh. 73A at 29; Exh. G at 19. E. James Collord, however, used rates of $100 per foot for access drifts, $110 per foot for drifts along the vein, and $125 per foot for raises. See Exh. 66A at 24. We will use the lower costs assumed by Thurmond since they are supported by an actual quote. 17/ See Tr. 1180-81; Exh. 121 ($77.53/foot) At that rate the cost of running an access drift to the valuable section of the vein on the GB-1 claim (150 feet), the drift along that portion of the vein (155 feet), and the single raise (77.5 feet) is $32,130, or $18.94/ton. The additional cost to run the access drift to the valuable section of the vein on the GB-2 claim (128 feet) and the drift along that portion of the vein (172 feet) is $25,200. If the vein on the GB-2 claim were mined alone, such mining would incur total development costs of $57,330, or $22.02/ton.

Costs of operating the mine, transporting the ore to the mill, and operating the mill must also be considered. It is assumed that ore would be removed by a prudent miner by the method of resuing so that only vein material would be removed from the mine. See Tr. 172, 245-47, 626-27, 651; Exh. 66A at 9; A Dictionary of Mining, Mineral, and Related Terms 917 (Bureau of Mines 1968) ("resuing"). Although Thurmond considered this mining method acceptable, she chose instead to project costs for shrinkage stoping, believing that it would be more economic. See Tr. 140, 247-48, 250; Exh. G at 17; Exh. 73A at 26. We are persuaded to adopt the resuing method for validity determination purposes. Resuing is an acceptable

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16/ The Forest Service had based its cost analysis on the assumption that two raises would be run in each of the two principal ore bodies (Blocks I and II). See Exh. 73A at 25. However, the Forest Service assumed that drifts of either 763 and 524 (or a total of 1,287 feet) or 852 and 311 feet (or a total of 1,163 feet) would be run on the two blocks of ore. See Exh. 73A at 25, 32; Exh. G at 20. Since we presume that drifts of 155 and 172 feet will be run along the high- and medium-grade ore bodies (or a total of 327 feet), we agree with E. James Collord that only one raise need be run. See Exh. 66A at 10.

17/ Thurmond testified she later determined that her development costs were low. See Tr. 139. Also, Scott A. Stebbins, a mining engineer with the Bureau of Mines, concluded that the costs to run development drifts and raises would be $95.92 and $92.52/foot. See Exh. 85 at 6. If we use Collord's higher costs, the total cost for developing the GB-1 claim alone is $41,737.50, or $24.60/ton. This slight increase in development costs does not make that claim unprofitable to mine. If both higher-grade ore deposits are developed together, the total cost amounts to $73,457.50, or $28.22/ton in the case of mining just the GB-2 claim and $17.08/ton in the case of mining both claims.

method and will result in lower mining costs because it will involve less time and effort to mine the vein rock since, with almost no handsorting, virtually no surrounding waste material will need to be removed from the mine (which is not the case with shrinkage stoping). See Exh. 85 at 1. The deposits involved here are well-suited to that method since the ore breaks cleanly from the wall rock. See Tr. 647, 649, 729, 883, 892-93, 1043; Exh. 66A at 2, 9; Thompson Report at 5.

That resuing will involve less cost can be illustrated as follows. Thurmond estimated in her February and October 1986 reports that mining would cost either $52.39 or $61.78 per ton. See Exh. 73A at 30; Exh. G at 19. But if Block I were mined by shrinkage stoping methods, the claimants would be required to remove not only the 44,215-ton or 18,629-ton ore body, but also 49,056 or 22,353 tons of waste. See Exh. 73A at 23; Exh. G at 16. Similarly, in the case of Block II, 27,538 or 7,386 tons of waste would have to be mined in order to extract the 16,395-ton or 2,963-ton ore body. See Exh. 73A at 24; Exh. G at 16. This approach would increase overall mining costs since both ore and waste would be mined at the given rate. See Exh. 73A at 32; Exh. G at 20. Taking the total cost of mining the ore and waste reported by Thurmond ($4.8 or $2.5 million for Block I, and $2.3 million or $639,361, for Block II), we can calculate the cost to mine the ore at $135.91 or $110.52/ton, in the case of Block I, and $215.78 or $140.39/ton, in the case of Block II.

By contrast, the mining costs estimated by E. James Collord, using the resuing method, are about $74.42 for each ton of ore mined. 18/ He found that total mining costs, using the resuing method, would be $12,295 per month (including a 15-percent contingency). See Exh. 66A at 9, 28. From this amount we can subtract costs for road maintenance and reclamation that will otherwise be taken into account. This leaves total mining costs of $11,833.50 per month (including a 15-percent contingency). In order to translate these costs into tonnage costs for the expected operation, we first determine the total mining costs that would be incurred. Collord estimated that his small-scale operation would recover 7 tons of ore daily, or 159 tons monthly. See Tr. 858, 1079, 1082; Exh. 66A at 9, 28. On this schedule, the high-grade ore body (1,696.63 tons) would be mined out in 10.67 months, incurring total mining costs of $126,263.44. This translates into total mining costs of $74.42 for each ton of ore mined. Similarly worked, the medium-grade ore body (2,603.39 tons) would be mined out in 16.37 months, incurring total mining costs of $193,714.39. This translates into total mining costs of $74.41 for each ton of ore mined using the resuing method, which we find demonstrably preferable to the shrinkage stoping method in this case.

18/ We note that Stebbins estimated, after a detailed analysis encompassing labor, fuel, and other factors, that a small-scale mining operation would incur operating costs of $37.04/ton. See Tr. 357; Exh. 85 at 5. Wallace increased those costs to $51.59/ton. See Exh. 108 at 2.

The vein material would then be transported a short distance by truck to a newly constructed mill and milled by the gravity separation method. See Tr. 1080; Exh. 66A at 11, 12; Exh. G at 18; Exh. 73A at 27, 29. Thurmond placed the proposed mill on private land at Big Creek 13 miles from the minesite, and estimated transportation and milling costs of $5.59/ton and $25.70/ton. See Exh. 73A at 30; Exh. G at 19. E. James Collord and Wallace placed the mill at the Lost Dutchman millsite 1.5 miles from the minesite. See Tr. 312-13, 516, 676-77; Exh. 66A at 12; Exh. 73A at 30; Exh. 77D at 1-3. By using the method outlined above for deriving costs per ton using the monthly cost figures provided by Collord, we conclude that transportation and milling costs would be on the order of $7.23/ton and $62.85/ton. We will use the lower costs estimated by Thurmond since they are supported by the evidence and have not been shown to be in error. 19/ See Tr. 312; Exh. 108 at 2. The milling costs were evidently taken from calculations done by Jeffrey A. Gabardi, a Forest Service mining engineer, regarding a similar mill. See Tr. 422, 425-26, 430. We accept the proposition that milling would be done at the millsite, since that was the claimants' stated intention. This results in decreased transportation costs of $0.65/ton ($0.43 per ton mile x 1.5 miles). See Exh. 73A at 44. The milled ore (or "concentrates") would then be transported 13 miles, at a cost of $5.59/ton ($0.43 per ton mile x 13 miles), and sold to a custom milling facility. Tr. 1144; Exh. 66A at 11. The tailings would be dewatered and transported 0.22 miles (at a cost of $0.09/ton) and buried at the Golden Bear millsite claim. See Tr. 1103; Exh. 66A at 12; Exh. 77D at 1-3.

This results in costs for mining, transporting, and milling of $106.45/ton in the case of the GB-1 claim, and $106.44/ton for the GB-2 claim. See also Exh. 49 at 6. Total principal operating and development costs are $125.39/ton, for mining just the high-grade deposit on the GB-1 claim, and $128.46/ton if only the medium-grade deposit on the GB-2 claim were to be mined. The price paid by the custom milling facility for the ore would be the value of 95 percent of the gold recovered from the concentrates decreased by 7.5 percent of that value to reflect a charge for processing the ore to recover "dore gold." See Tr. 980, 982; Exh. 59 at 5, 6, 8; Exh. 66A at 11. This would result in a decreased value of the ore to $425.06/ton in January 1984 and $368.46/ton in June 1985, in the case of the GB-1 claim, and $105.66/ton in January 1984 and $91.58/ton in June 1985, in the case of the GB-2 claim. Before considering capital costs, the high-grade ore deposit on the GB-1 claim could therefore have been mined and milled at a profit of $299.67/ton in January 1984 and $243.07/ton in June 1985. A profit would not have been earned by mining and milling just the medium-grade ore deposit on the GB-2 claim. Instead, that claim would have had a loss of $22.80/ton in January 1984 and $36.88/ton in June 1985.

Capital costs and related operating costs must nonetheless be calculated in order to complete the total cost analysis. According to Thurmond,

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19/ After a detailed analysis, Stebbins concluded that milling costs would be on the order of $28.77/ton. See Exh. 85 at 5.

such costs encompass the costs of reconstructing and maintaining a 9.5-mile-long section of the Big Creek Road and constructing and maintaining a new 1.5-mile-long road from that road to the mining claims. Also included were costs of building necessary facilities for the mine and mill, costs of purchasing the necessary equipment to run the mine and mill, and costs of reclaiming the roads at the conclusion of mining and milling. See Exh. 73A at 28-29. In February 1986 Thurmond estimated these costs would total $438,260. 20/ See Exh. 73A at 32. Of this amount, a total of $257,305 would go to build the mine and mill facilities and purchase mining and milling equipment. See Exh. 73A at 31. By contrast, E. James Collord allocated $163,185 to this activity (including a 15-percent contingency). See Tr. 1102; Exh. 66A at 25-27. We are persuaded to adopt Collord's facility and equipment costs. Indeed, the list of facilities and equipment relied upon by Thurmond (see page 31 of her February 1986 Mineral Report (Exh. 73A)) is based on lists generated by the claimants. See Tr. 264. Collord's list appears in the more recent July 1988 Feasibility Study (Exh. 66A), at pages 25-27. Collord's costs are therefore geared to the shorter and smaller operation that would be conducted here. See Tr. 264, 277, 406, 407-09, 652, 653, 662, 1081-82, 1099, 1176-77, 1187; Exh. 66A at 9, 14, 29; Exh. 73A at 31; Thompson Report at 10. Collord stated that his costs for an operation having a 13-year mine life would apply to the shorter operation considered here. 21/ See Tr. 1107-08, 1125-26; Exh. 119 at 3. His estimate assumes that used equipment will be employed on the shorter project. See Tr. 1101; Exh. 66A at 14. By contrast, Thurmond planned on using some new equipment. See Tr. 266; Exh. 73A at 28, 29. Clearly, new equipment is not warranted in the case of a short-term operation. See Tr. 369, 634-35, 660, 1186-87; Thompson Report at 10. Some of Collord's equipment costs are supported by actual quotes. See Tr. 863-64, 1175-77, 1187; Exhs. 71 and 72. Further, Collord's costs reflect a more detailed analysis of the necessary mining and milling operation, and exhibit a greater familiarity with the practicalities of a small mining and milling operation. See Tr. 619-21, 623-24, 632, 633, 651-53, 655-56, 659-62, 699-700, 1081; United States v. Mannix, supra at 117, 119.

Insofar as roads are concerned, construction of the road from Big Creek Road to the mining claims is clearly necessary in order to bring men and supplies to the mining operation and to haul ore to the mill. Likewise,

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20/ She changed the total to $433,310 in October 1986, without explanation. See Exh. G at 19.

21/ Collord stated that the costs of milling equipment to include a crusher, ball mill, concentrating table, motor, water pump, and generator, would total $23,000. See Exh. 66A at 26. Emmett Routson, a miner, reported that a similar mill, able to handle 5 tons per day, cost him $12,067 in 1984. See Tr. 467-68, 468, 478-79; Exh. 110 at 1. His crusher, however, was handmade and no evidence of labor costs was submitted. See Tr. 479, 481. Another mill, able to mill 50 tons per day, was built by Robert Weatherby, a miner, in 1983 at a cost including labor of $28,000. See Tr. 862, 863-64.

some reconstruction would be needed on the Big Creek Road. See Tr. 46, 48-49, 58, 454; Thompson Report at 10. Barry F. Stata, a civil engineer with
the Forest Service, concluded that $78,211 was necessary for construction and $66,425.43 for reconstruction (including the creation of a parking lot at the entrance to the wilderness area and the construction of two bridges along the Big Creek Road). See Tr. 141; Exh. 104 at 3, 6, 11, 14, 15. Also involved would be costs of "mobilization" including bonding, insurance, and overhead, which would amount to 8 percent of the construction costs. See Exh. 104 at 9. These costs were adopted by Thurmond. See Exh. 73A at 32. The amount necessary for reconstruction was decreased to $26,425 in the event that milling would be done at the Lost Dutchman millsite. See Exh. 73A at 44. Collord placed the costs of construction (including mitigation of environmental impacts) and reconstruction at $36,570 and $17,250 (including a 15-percent contingency). See Exh. 66A at 25, 27. We adopt Collord's costs since they are aimed at creating the kind of roads necessary for the short-term, small-scale operation to be conducted here, were developed by someone experienced in road building and repair (Collord), and are supported by an actual bid by someone similarly so experienced (Jim Adkins). See Tr. 591-92, 592-93 (2-mile-long ore-haul road constructed over similar steep terrain for $6,800 in 1980), 596-97, 604, 608, 630, 658-59, 731, 1021-22, 1023-24, 1099; Exh. 25 at 1, 3, and 4 (2.2-mile-long road could be built for one-half cost of from $36,000 to $39,700); Exh. 75 at 1 ($2,185 bid for reconstruction of Big Creek Road and $21,420 bid for new 1.8-mile-long road construction); Exh. 77D at 4-1, 4-3 ($11,000 to $15,000 needed for reconstruction).

Richard Mohr, a private civil engineer with a background in soils and water resources management, testified that he had traveled the length of the Big Creek Road and determined that only minimal repair of that road was required and no bridges were needed to cross the creek where it intersects the road, given the rocky nature of the creek bed. See Tr. 500, 501, 504, 505-06, 507, 509, 512-13, 578; Exh. 77D at 1-2. Forest Service engineer Stata admitted that bridges would not be needed if ore were milled at one of the millsite claims. See Tr. 51-52. Likewise, a parking lot was only intended as a source of fill material. See Tr. 53-54. There is no evidence that the claimants would need such material. Eliminating the costs for constructing a parking lot and two bridges, the costs estimated by Stata amount to $7,851.93 (including 8 percent for mobilization). See Exh. 104 at 5, 10, 13. This compares favorably to Collord's cost of $17,250. See Exh. 66A at 25, 27.

The record indicates that the Forest Service would construct a "full-bench" road over 90 percent of the proposed roadway from the Big Creek Road to the minesite that is steeper than the angle of repose. See Tr. 24, 25-26, 39, 74, 571, 1055; Exh. 18 at 3. The bulk of the costs involved in building such a road were for excavation ($68,033). See Exh. 104 at 14. By contrast, the claimants' proposed "cut-and-sidespill" type of road would involve lower costs since it requires less excavation. See Tr. 601, 1054-57; Exh. 122. Moreover, that road is feasible and preferred for both economic and safety reasons, even given the general steepness of the area.

See Tr. 522-23, 533, 598, 600-02, 881-82, 1053-54, 1057-58; Exh. 122. Emmett Routson reported that such a road was approved by the Forest Service for his mining operations, even though it similarly crosses terrain that is "extremely steep in some places" (Tr. 473). See Tr. 477, 493; Exh. 43 at 4. In addition Collord assumed a $5,000 cost for obtaining necessary permits. See Exh. 66A at 25. We adopt this cost. See Exh. 77D at 1-11.

Stata calculated that it would cost $1,388 annually for road maintenance. See Exh. 73A at 32; Exh. 104 at 16. If mining the two higher-grade deposits lasted 4.9 years (4,300.02 tons mined at 875 tons per year, see Exh. 66A at 9), the total cost of road maintenance would be $6,801.20. This translates to $2,637.20, or $1.55/ton, for mining just the GB-1 claim and $4,164.00, or $1.60/ton, for just the GB-2 claim. By contrast, Collord concluded that monthly road maintenance would cost $345, or $1,897.50 annually (given 5.5 months of annual operation). See Exh. 66A at 9, 28; Exh. 75 at 1 ($2,280 per year). His total cost for road maintenance would be $9,297.75 (given a 4.9-year mine life), or $3,605.25 ($2.12/ton) for the GB-1 claim alone, and $5,692.50 ($2.19/ton) just to mine the GB-2 claim. We adopt Stata's lower costs.

So far as reclamation is concerned, the Forest Service was only concerned with reclaiming the constructed and reconstructed roads, concluding that the total cost would be $3,664, if only the new road were reclaimed, and $10,868, if both roads were reclaimed. See Exh. C at 4; Exh. 73A at 29, 44. Collord provided instead for amassing a fund to reclaim the mine and millsites during the course of operations by collecting $575 (including a 15-percent contingency) every month of operation. See Exh. 66A at 13, 28. A 10.67-month operation on the GB-1 claim and a 16.37-month operation on the GB-2 claim would thus collect, for purposes of concurrent reclamation, a total of $6,135.25 and $9,412.75, or a total for both claims of $15,548. In addition, Collord provided for $15,000 as the amount required for final reclamation of the mine and millsites and the roads. We will adopt Collord's costs as the total costs of reclaiming not only the roads, but also the mine and millsites. 22/ This means that the cost of all reclamation would amount to $21,135.25, or $12.46/ton, in the case of mining just the GB-1 claim and $24,412.75, or $9.38/ton, in the case of mining just the GB-2 claim.

Capital costs, including purchase of equipment and facilities, construction and reconstruction of roads, and permits, therefore amount to $222,005. If only the high-grade deposit on the GB-1 claim were to be worked, this would have meant capital costs of $130.85/ton. If only the medium-grade deposit on the GB-2 claim were to be worked, this would have meant capital costs of $85.28/ton. As a consequence, mining and milling the high-grade deposit on the GB-1 claim would have shown a profit, taking into account all development, operating (including for road maintenance and reclamation), and capital costs, of $154.81/ton in January 1984 and $98.21/ton in June 1985.

22/ Mohr calculated that the cost to reclaim both millsites and the new road to the minesite would be $4,920. See Exh. 77D at 1-11.

The overall loss from mining and milling the medium-grade deposit on the GB-2 claim would have been $119.06/ton in January 1984 and $133.14/ton in June 1985. 23/

Assuming that the high- and medium-grade deposits on the two claims were to be independently mined and milled, only the GB-1 claim could be said to have a deposit of minerals that could have been extracted, removed, and marketed at a profit at the time of withdrawal and also when the final certificate was issued. Nonetheless, the claimants do not intend to mine and mill the two deposits separately. Nor would a prudent miner do so, since it would result in a duplication of effort and costs. Rather, the drift run to and then along the high-grade deposit on the GB-1 claim would be extended to and along the medium-grade deposit on the GB-2 claim. The roads developed, equipment purchased, and facilities erected for working the high-grade deposit would be equally useful to mine the medium-grade deposit. A prudent miner would operate a single mine and mill, just as Thurmond assumed. See Tr. 255; Exh. 73A at 33; Exh. G at 21.

[2] The existence of economies of scale in mining claim cases has been accepted where questions of profitability are at issue. We have found that a group of mining claims of a particular claimant or group of claimants may be considered together for purposes of determining whether there exists on each of the claims a valuable mineral deposit. United States v. New York Mines, Inc., 105 IBLA 171, 191, 95 I.D. 223, 234 (1988); United States v. Foresyth, 100 IBLA 185, 250, 94 I.D. 453, 489 (1987); Schlosser v. Pierce, 92 IBLA 109, 130, 93 I.D. 211, 223 (1986). So long as valuable locatable minerals are exposed on each of the claims, it has been assumed that their quality and quantity may be aggregated to determine if they might be extracted, removed, and marketed at a profit. See Cactus Mines Limited, 79 IBLA 20, 32-33 n.2 (1984) (concurring opinion). In this way, while each of the claims in a group may have such a deposit of minerals that extracting, removing, and marketing it would not result in a profitable operation, nevertheless it can be possible that by combining the deposits a profitable operation would likely result from the development of each claim. This is so because fixed development and capital costs are spread over a larger reserve base, causing a decrease in tonnage costs charged to the claim or group of claims and a surplus results in the expected recovery per ton from each claim. Put another way, as the Supreme Court recognized in Jackson v. Roby, 109 U.S. 440, 445 (1883) (quoted in Schlosser v. Pierce, supra at 129, 93 I.D. at 223):

> It often happens that for the development of a mine upon which several claims have been located, expenditures are required

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23/ Even using Collord's higher development figures ($24.60/ton for the high-grade deposit and $28.22/ton for the medium-grade deposit), milling ($62.85/ton), and transportation ($7.23/ton) costs, the GB-1 claim could be mined at a profit since total costs would amount to $313.96/ton. The GB-2 claim could not since total costs would be $268.97/ton. Recovery from the GB-2 claim would not even cover principal operating costs of $144.49/ton.

> exceeding the value of a single claim, and yet without such expenditures the claim could not be successfully worked. In such cases it has always been the practice for the owners of different locations to combine and to work them as one general claim.

See also United States v. Denison, 76 I.D. 233, 243 (1969), aff'd sub nom., Smith v. Udall, No. 1053 (D. Ariz. Jan. 31, 1972), aff'd, 489 F.2d 1275 (9th Cir), cert. denied, 419 U.S. 835 (1974) (quoted in Schlosser v. Pierce, supra at 130, 93 I.D. at 223) ("It is also essential to have an estimate of the quantity of ore within the mining claims since a large quantity of ore would justify expenditures for equipment, etc. which a small deposit could not support." (Emphasis added.) For this reason, we have held that this economy in development and capital costs is sufficient to validate each of the claims since each will be considered to have a valuable mineral deposit. In a proper case, a person of ordinary prudence would, by developing all claims rather than a single individual claim, justifiably expend labor and means with a reasonable prospect of success in developing a valuable mine.

Mining and milling the high- and medium-grade deposits on the GB-1 and GB-2 claims together would result in the recovery of a total of 3,884.87 ounces of gold, valued at $1,482,077.90, or $344.67/ton, in January 1984 and $1,284,571.10, or $298.74/ton, in June 1985. Given a mine dilution of 10 percent, an 85-percent mill recovery, a 95-percent custom mill recovery, and custom milling costs of 7.5 percent, that would yield $231.70/ton in January 1984 and $200.83/ton in June 1985. Operating the two claims as a single mine would, however, result in a per ton decrease in development and capital costs applicable to the individually profitable and nonprofitable claims because of the larger reserve base. The total costs of developing a single mine by running drifts and a raise would amount to $57,330, or $13.33/ton (assuming the recovery of 4,300.02 tons of ore). This is compared to $18.94/ton in the case of developing a mine with respect to only the GB-1 claim and $22.02/ton in the case of developing a mine with respect to only the GB-2 claim. Similarly, in the case of joint mining and milling operations, capital costs would total $222,005, or $51.63/ton, as opposed to $130.85/ton to mine and mill only the high-grade deposit on the GB-1 claim and $85.28/ton for mining and milling only the medium-grade deposit on the GB-2 claim. Road maintenance and reclamation costs would amount to $1.58/ton and $7.10/ton (given mine operations of 4.9 years recovering 4,300.02 tons of ore). The total costs of mining ($74.41/ton), milling ($25.70/ton), and transporting ($6.33/ton) the two deposits would be $106.44/ton. The total development, operating, and capital costs would therefore be $180.08/ton. Consequently, the higher-grade deposits on the two mining claims could have been extracted, removed, and marketed together at a profit of $51.62/ton in January 1984 and $20.75/ton in June 1985.

But while the deposit on the GB-1 claim could be extracted, removed, and marketed at a profit for each ton of ore removed ($154.81/ton in January 1984 and $98.21/ton in June 1985), the continued extraction, removal, and

marketing of the deposit on the GB-2 claim would result in a significantly lesser profit for each ton of ore removed overall ($51.62/ton in January 1984 and $20.75/ton in June 1985) than if the GB-1 claim alone were developed. Looked at another way, the overall anticipated profit from mining and milling only the 1,696.63 tons of ore within the GB-1 claim would be $262,655.29 in January 1984 and $166,626.03 in June 1985. By continuing operations into the GB-2 claim, the Collords would, by extracting, removing, and marketing an additional 2,603.39 tons of ore, obtain a significantly lower overall profit of $221,967.03 in January 1984 and $89,225.42 in June 1985. The reason for this is obvious. Any operations conducted on the GB-2 claim would incur an operating loss of $0.78/ton in January 1984 and $14.86/ton in June 1985 (given the recovery of $105.66/ton in January 1984 and $91.58/ton in June 1985, and principal operating costs alone of $106.44/ton). Thus, each ton extracted, removed and marketed from the GB-2 claim would decrease the profit expected from the recovery of ore from the GB-1 claim.

In order to be considered valid under the mining law, each claim in a group must have, within its borders, a valuable mineral deposit capable of producing income that exceeds the cost of mining, transporting, milling, and marketing the deposit. United States v. Coleman, supra at 600, 602; Waskey v. Hammer, 223 U.S. 85, 90-91 (1912). The recovery expected from each claim must exceed at least the costs of mining, transporting, milling, and marketing the particular deposit on that claim. In In Re Pacific Coast Molybdenum Co., supra at 24, 24 n.7, 25-26, 32, 90 I.D. at 357, 357 n.7, 357-58, 361, we upheld a finding that each of 32 mining claims had a valuable mineral deposit where both the claimant and the Government had concluded that the anticipated per ton recovery exceeded at least the per ton mining, milling, and transportation costs. That is not true in the case of the GB-2 claim. The mining laws of the United States make land available to members of the public for the purpose of mining valuable mineral deposits and not for other purposes. See United States v. Coleman, supra at 602. It does so by rewarding them with a patent where they have established that a prudent man would justifiably mine a mineral deposit with a reasonable prospect of success in developing a valuable mine. Id. No prudent man, having profitably mined a deposit on the GB-1 claim, would be justified in continuing his operations into the GB-2 claim where the final result would be a diminishment of his initial profit. Plainly, in this situation, patenting the GB-2 claim would not lead to the mining of the deposit on that claim, but would instead thwart the ultimate aim of the mining laws. Therefore, the GB-2 claim cannot be said to have a valuable mineral deposit.

In order for there to be a valuable mineral deposit on each of the claims in a group, the recovery expected from each claim must not only exceed the costs of mining, transporting, milling, and marketing the particular deposit on that claim but each claim must also bear a proportionate share of the development and capital costs attributable to the combined operation. See Schlosser v. Pierce, supra at 131-32, 93 I.D. at 224 (referring to In re Pacific Coast Molybdenum Co., supra at 24, 24 n.7, 25-26, 32, 90 I.D. at 357, 357 n.7, 357-58, 361). In Pacific Coast,

we upheld a finding that each of 32 mining claims had a valuable mineral deposit where both the claimant and the Government had concluded that anticipated recovery per ton also exceeded the per ton development and capital costs (especially those associated with environmental compliance). Mining and milling the ore from each claim in a group incurs costs, not only those involved in actual day-to-day operations, but also development and capital costs involved in setting up the mine and mill. 24/ United States v. American Independence Mines & Minerals, supra at 187; United States v. McKenzie, 20 IBLA 38, 45 (1975); United States v. Larsen, supra at 272-73. Accordingly, we must conclude that the deposit on each claim must be sufficient to bear at least a proportionate share of the development and capital costs. We find no sanction for another approach in the mining laws.

While the unit-of-measure recovery expected from mining and milling the high-grade deposit on the GB-1 claim ($425.06/ton in January 1984 and $368.46/ton in June 1985) would exceed development, operating, and capital costs of a single mine and mill ($180.08/ton), the recovery expected from mining and milling the medium-grade deposit on the GB-2 claim ($105.66/ton in January 1984 and $91.58/ton in June 1985) would not. Mining and milling the medium-grade deposit on the GB-2 claim would recover a total of $275,074.18 in January 1984 and $238,418.45 in June 1985, clearly insufficient to cover operating costs ($299,702.25) and a proportionate share of development and capital costs with respect to that 2,603.39-ton deposit ($169,119.67). But the recovery expected from the GB-1 claim ($721,169.54 in January 1984 and $625,140.28 in June 1985) would exceed operating costs ($195,316.04) and a proportionate share of development and capital costs for the 1,696.63-ton deposit ($110,215.33). Consequently, the GB-2 claim cannot be considered to have a valuable mineral deposit even were development and capital costs to be decreased by operating a single mine and mill with respect to both claims.

By focusing his effort on the higher-grade deposits, a person of ordinary prudence would not be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine on both the GB-1 and GB-2 claims. He would be so justified only in the case of the GB-1 claim. We therefore conclude that the preponderance of the evidence demonstrates that the GB-1 claim is a valid claim that is supported by the discovery of a valuable mineral deposit and that the GB-2 claim is not a valid claim because it is not so supported. We therefore affirm Judge Sweitzer's finding with respect to the GB-2 claim and reverse his contrary finding with respect to the GB-1 claim.

[3] His February 1989 decision also declared the Lost Dutchman and Golden Bear millsite claims invalid because they were neither associated with a valid mining claim nor being used for mining or milling purposes.

24/ Not included are development and capital costs that have already been spent before the date on which a valuable mineral deposit must be shown to exist. See United States v. Mannix, supra at 119.

Since we find that the GB-1 mining claim is valid, any millsite claim reasonably associated with that claim would also be valid if it was being "used or occupied * * * for mining or milling purposes" in connection therewith, as required by 30 U.S.C. § 42(a) (1988). United States v. Shiny Rock Mining Corp., 112 IBLA 326, 360 (1990); United States v. Swanson, 93 IBLA 1, 20, 93 I.D. 288, 299 (1986). Actual use or occupancy is the sine qua non of the statutory grant. United States v. Swanson, supra at 28, 93 I.D. at 303. The statute "contemplates a function or utility intimately associated with removal, handling, or treatment of the ore from the vein or lode. Some action directly connected with the process of mining or some feature of milling must be performed upon, or some recognized agency of operative mining or milling must occupy the mill site." Alaska Copper Co., 32 L.D. 128, 131 (1903) (emphasis in original). Further, such use or occupancy must be established in the instant case as of the date of withdrawal of the land. United States v. Werry, 14 IBLA 242, 249-50, 81 I.D. 44, 47-48 (1974).

The two millsite claims, which are situated along creeks a short distance downslope from the mining claims, were not being used for mining or milling purposes by claimants at any time. Neither Thurmond nor Wallace could find any evidence of such use in June 1985 or thereafter. See Tr. 144, 315; Exh. 73A at 9, 11; Exh. G at 7, 8. The only improvements observed on the claims were two old cabins, one seriously deteriorated and the other less deteriorated with an attached shed containing broken tools and assorted odds-and-ends. See Tr. 144; Exh. 73A at 9, 11; Exh. G at 7, 8. The cabins were in existence before the claimants owned the claims. See Exh. G at 7. The claimants assert that James Collord and his son and an employee camped on the claims in the cabins while sampling activities were conducted and assessment work was performed on the mining claims. See Tr. 676, 678, 682, 683, 689-90, 1046. Use of a millsite claim as a staging area for prospecting activities on a mining claim does not constitute use of the land for mining purposes since such activities are not mining operations. United States v. Wedertz, 71 I.D. 368, 371, 373 (1964). Nor does use as a staging area for assessment work constitute use for mining purposes where there is no evidence that the work was part of mining operations on the mining claim. Compare with Eclipse Mill Site, 22 L.D. 496, 497, 499 (1896) (stabling of horses used in mining); Satisfaction Extension Mill Site, 14 L.D. 173, 174 (1892) (houses used by men working in mill); Charles Lennig, 5 L.D. 190, 192 (1886) (houses used by men working in mine). There were no mining operations here. See Tr. 307, 361. Even if prospecting or assessment work activities were to constitute mining, occasional use of the millsite claims (Tr. 676, 678, 683, 690) does not satisfy 30 U.S.C. § 42(a) (1988). United States v. Polk, A-30859 (Apr. 17, 1968), at 4, 5. Finally, there is no evidence that either of the millsite claims was being used for milling purposes.

The record indicates the claimants may have occupied the millsite claims with a good faith intention to eventually use them for mining and milling operations. They kept tools and building materials on the claims with the stated intention of improving the cabins so that they could house

men who would build a road and work on the mining claims and build a mill on the Lost Dutchman millsite claim. See Tr. 676-77, 851, 1046-47. Claimants allege that before the land was withdrawn from mineral entry they were prevented from engaging in mining and milling operations by Forest Service administrative delays. See Statement of Reasons (SOR) at 10 n.14, 26, 49; Tr. 676, 690, 1046-47. The Forest Service does not deny this allegation. The record demonstrates that the claimants made efforts to obtain permission to build a road (as they were required to do, see 36 CFR 228.12) starting in 1981, but approval was delayed by the need to obtain a more detailed mining plan from the claimants and by environmental review and decisionmaking by the Forest Service. See Tr. 9, 65-66, 68-69, 678-80, 683, 687-88, 693, 700; Exhs. 7 through 12, 18, 22, and 23. A permit for a 4-foot-wide access trail was issued by the Forest Service on August 18, 1983, conditioning use on the approval of a mine operating plan. See Tr. 695; Exh. 19. Given the limited and exploratory nature of the mining operations proposed, which were intended merely to confirm the presence of surface indications of gold at depth (Tr. 108-09, 448; Exhs. 9 and 12), this trail was considered adequate to permit the motorized transportation of men and equipment to the minesite. See Decision Notice and Finding of No Significant Impact (Decision Notice), dated May 31, 1983, at 1; Tr. 116; Exh. 18 at 4-14. In addition, the claimants were permitted to airlift heavier equipment to the minesite by helicopter. See Decision Notice at 1, 2; Exh. 23 at 2. The claimants were given a choice of whether to apply for road access in the future, depending on the establishment of ore reserves and the need for expanded operations. See Decision Notice at 1. We find nothing inappropriate in the Forest Service's actions. In the end, the claimants constructed no trail, concluding that it was too costly to build. See Tr. 700, 702-03; Exhs. 26 and 28. Following withdrawal of the land from mineral entry they again sought permission to build a road, however, the Forest Service delayed approval of the road until there could be a determination of the validity of the mining claims after mineral examination. See Tr. 70, 86-88; Exh. 33; Exh. 41 at 2; United States v. American Independence Mines & Minerals, supra at 179, 182. In the meantime, no mining operations were permitted on the claims. Likewise, road construction was not permitted. The only activity allowed was the investigation undertaken to prove the pre-existing discovery of a valuable mineral deposit. This was proper. See United States v. Mavros, 122 IBLA 297, 310-11, 313 (1992). We find no evidence that claimants were prevented, following withdrawal, from proving a pre-existing discovery on either mining claim.

Before withdrawal the claimants took the first steps in an apparent effort to ready the millsite claims for use for mining and milling purposes by gathering building material on the claims for use in building facilities that would be used in connection with milling operations. Nonetheless, the mere intention to use a millsite in the future for mining or milling purposes in connection with a valid mining claim does not constitute compliancewith 30 U.S.C. § 42(a) (1988). United States v. S.M.P. Mining Co., 67 I.D. 141, 143-44 (1960); United States v. Herron, A-27414 (Mar. 18, 1957), at 3; 2 Lindley on Mines § 521 (3rd ed. 1914) at 1176. We have concluded that "'occupation, by improvements or otherwise, as evidences an

intended use of the tract in good faith for mining or milling purposes,'" given the exigent practicalities of the situation, will suffice. United States v. Swanson, supra at 26, 93 I.D. at 302 (quoting from Charles Lennig, supra at 192) (in Swanson, in addition to 28 unpatented mining claims, there were 7 patented claims which had been intermittently operated as a mine since 1882); see also United States v. Langmade & Mistler, 52 L.D. 700, 703-04 (1929); 2 Lindley on Mines § 521 (3rd ed. 1914) at 1176. But when determining whether there is intended use in good faith, the lack of use for mining or milling purposes and the likelihood that such use will occur must be objectively judged by what is reasonable. See United States v. Cuneo, 15 IBLA 304, 323, 325-27, 81 I.D. 262, 271, 272-73 (1974).

In the present case, the GB-1 mining claim is valid and mining operations are projected to involve the removal of at least 4,300 tons of ore over 4.9 years. That ore will require milling. In addition, the claimants state that they intend to construct a mill on the Lost Dutchman millsite claim once mining operations are approved, and had so intended since the location of the claim. See Tr. 516, 676-77; Exh. 66A at 12; Exh. 77D at 1-3. Nevertheless, no improvements that could be used in connection with either mining or milling operations were actually constructed by the claimants on either millsite claim. Compare with United States v. Shiny Rock Mining Corp., supra at 358, 359; United States v. Swanson, supra at 25, 38 n.18, 93 I.D. at 301-02, 308 n.18; United States v. Skidmore, 10 IBLA 322, 327 (1973). The claimants did little more than place building materials on the millsites. They made no effort, prior to withdrawal of the land from mineral entry, to improve the cabins or to begin construction of a mill, although there is no evidence that they would have been denied permission to do so by the Forest Service. Beginning in July 1980 they had permission from the Forest Service to use the Big Creek Road that provided motorized access to both millsite claims. See Tr. 674-75, 691, 701; Exh. 5; Exh. 11 at 2; Exh. 17; Exh. 57 at 1. We conclude that they chose not to proceed further given the delays encountered in approval of construction of a road to the mining claims and their purported inability to conduct mining operations on those claims. Nonetheless, they could have done more, since it was reasonably foreseeable that road access to the minesite would eventually be approved, inasmuch as reasonable access is guaranteed to the owner of a valid mining claim, despite designation of a wilderness area by the Forest Service. See Exh. 18 at 2; 16 U.S.C. §§ 1133(d)(3) and 1134(b) (1988); 36 CFR 228.12 and 228.15(b) and (c). The claimants might not delay activity on a dependent millsite claim on the assumption that their associated lode mining claim is invalid. If they believed their claims were valid they should have acted accordingly. 25/ See Tr. 716. Their failure to make improvements and expend more effort to develop the claims was their choice. As a consequence of their failure to act, we must conclude that neither millsite claim has been occupied, consistent with the practicalities of the situation, so as to show use in good faith for mining or milling purposes. See United States v. Swanson, supra at 22-23, 25-26, 93 I.D. at

25/ We note that the mill need not be located on either millsite claim, which may explain the delay in building it there. See Exh. 73A at 27.

300-301, 301-02; United States v. Cuneo, supra at 327-28, 81 I.D. at 273; United States v. Skidmore, supra at 327-28; United States v. Wedertz, supra at 371, 372-73. We therefore find that a preponderance of the evidence demonstrates that the Lost Dutchman and Golden Bear millsite claims were not being used or occupied for mining or milling purposes in connection with a valid mining claim and affirm Judge Sweitzer's conclusion that the millsite claims are not valid.

We therefore conclude that Judge Sweitzer improperly declared the GB-1 lode mining claim invalid and rejected the patent application as to that claim. In this respect, his February 1989 decision is reversed. We find, however, that he properly declared the GB-2 lode mining claim and the Lost Dutchman and Golden Bear millsite claims invalid and rejected the patent application as to those claims. To that extent, his February 1989 decision is affirmed.

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed in part and reversed in part.

Franklin D. Arness
Administrative Judge

We concur:

C. Randall Grant, Jr.
Administrative Judge

John H. Kelly
Administrative Judge

APPENDIX I

FIRE ASSAY RESULTS-GOLDEN BEAR #1 AND #2 CLAIMS

(Sample sites listed west to east along Golden Bear vein)

Golden Bear No. 1 Claim

Sample Site	Location x 100	Sample Number	Sampler	Vein Width	Assay value OzAu/Ton
A	0.00	GB1-6	THURMOND	1.9'	0.130
		1410	HUBBARD	2.0'	0.036
		GB81-17	COLLORD	2.0'	0.170
B	0.72	none	COLLORD	1.5'	
C	1.17	none	COLLORD	1.5'	
D	1.31	GB1-5	THURMOND	1.8'	trace
		4000	THURMOND	1/	trace
		1409	HUBBARD	2.0'	0.104
		GB81-16	COLLORD	2.0'	0.244
E	1.70	GB1-4	THURMOND	2.25'	1.595
		4001	THURMOND	H W	trace
		4002	THURMOND	2/	0.280
		4003	THURMOND	3/	0.080
		1408	HUBBARD	3.3'	0.230
		GB81-15	COLLORD	2.8'	0.200
F	2.13	GB1-2	THURMOND	0.7'	1.290
		4021	THURMOND	Grab	0.860
		1406	HUBBARD	0.7'	2.637
		GB81-14	COLLORD	0.7'	2.000
G	3.00	GB1-3	THURMOND	2.6'	1.250
		4022	THURMOND	Grab	4.700
		1407	HUBBARD	2.2'	4.185
		GB81-12	COLLORD	2.2'	2.090
		GB81-13	COLLORD	H W	0.016
H	3.11	GB1-1	THURMOND	3.0'	0.065
		4023	THURMOND	Grab	0.160
		1405	HUBBARD	3.0'	0.054
		GB81-11	COLLORD	3.0'	0.470

1/ Described only as "vein material" (Tr. 131).
2/ Vein material from a small vein split off the main vein. Tr. 131-32.
3/ Footwall and 4 inches of vein material not included in previous sample. See Tr. 132.

Golden Bear No. 2 Claim

Sample Site	Location x 100	Sample Number	Sampler	Vein Width	Assay value OzAu/Ton
I	3.75	GB2-4	THURMOND	1.5'	0.050
		1404	HUBBARD	2.0'	0.434
		GB81-10	COLLORD	2.0'	0.246
J	4.13	GB2-3	THURMOND	0.9'	0.005
		1403	HUBBARD	1.0'	0.017
		GB81-9	COLLORD	1.0'	0.032
		GB81-8	COLLORD	0.3'	0.018
K	4.54	GB2-1	THURMOND	2.1'	0.675
		GB2-2	THURMOND	2.1'	0.160
		4004	THURMOND	H W	trace
		4005	THURMOND	4/	0.010
		4006	THURMOND	F W	trace
		1401	HUBBARD	2.25'	0.513
		1402	HUBBARD	2.25'	0.546
		GB81-1	COLLORD	2.7'	0.552
		GB81-2	COLLORD	1.8'	0.026
		GB81-3	COLLORD	F W	0.004
L	5.51	none	COLLORD	5/	
M	7.57	GB81-4	COLLORD	1.0'	0.004
N	9.63	GB2-5	THURMOND	2.0'	0.095
		1411	HUBBARD	3.0'	0.080
		GB81-5	COLLORD	2.2'	0.064
O	10.04	GB2-6	THURMOND	1.2'	0.105
		1412	HUBBARD	1.5'	0.030
		GB81-6	COLLORD	1.5'	0.120
P	11.35	GB2-7	THURMOND	0.9'	trace
		1413	HUBBARD	1.0'	0.001
		GB81-7	COLLORD	1.0'	0.004

4/ Described only as "vein material" (Tr. 132).
5/ Described on Exh. 97 as "[s]mall pit, vein not exposed."

IBLA 89-332

ADMINISTRATIVE JUDGE BURSKI CONCURRING IN THE RESULT:

One might conclude from a cursory review of the spate of opinions which this appeal has generated that the legal issues involved in this case are of exceptional complexity and the factual disputes irreconcilable. There is, however, a wide chasm separating that appearance and the reality presented herein. Notwithstanding the reams of paper which this appeal has consumed, it seems to me that there is little fundamental disagreement over those facts essential to make an informed decision. 1/ And, while the legal questions presented are certainly those upon which reasonable minds might differ, they are scarcely qualitatively more difficult than those which this Board is called upon to determine in a host of different areas of public land and mineral law.

To maintain a proper perspective of the areas of disagreement, it is important to keep in mind those questions upon which all of my colleagues are in agreement. Both the lead opinion and the dissent of Judge Mullen agree that two separate mineralized areas are disclosed within the limits of the GB-1 and the GB-2 lode mining claims. The first of these, which is referred to variously as the "high grade" or 1-A zone, is located on the GB-1, while the second, referred to as the "medium grade" or 1-B zone, is located on the GB-2. Both the lead opinion and Judge Mullen also agree that, in the absence of subsurface sampling, the depth of a surface vein may be presumed to be one-half its length as a matter of geologic infer-ence. And, more importantly, though apparently Judge Irwin is of a different mind, both the lead opinion and Judge Mullen agree that this principle also applies to the specific mineralized areas disclosed by sampling so that the delineated areas of surface values may be presumed to continue at depth for half the distance that those values exist along the strike of the vein. All agree that the high-grade zone was delineated by sample sites E, F, and G, extending approximately 153 to 157 feet on the surface with corresponding projection at depth of 76 to 78.5 feet. Finally, while my colleagues differ on the applicable assay values for the area of high-grade mineralization, this disagreement is of no substantial moment since all concur that a valuable mineral deposit has been disclosed within the high-grade zone. I am in agreement with my colleagues on all of these points. 2/

Where differences of note begin to arise, however, is in the determination of the length of the exposure in the "medium grade" or 1-B zone. Thus, the lead opinion posits a linear length of 172 feet, while Judge Mullen, following what he suggests is an "admittedly conservative approach,"

1/ The inferences properly drawn from these facts, however, are another matter.

2/ My computation of the applicable grade varies somewhat from that applied by either the lead opinion or Judge Mullen. Since, however, I agree with the ultimate conclusions of my colleagues as to the validity of the GB-1, I will not further burden the record of this decision by delineating the specifics of my disagreements.

computes a zone of mineralization which extends 68 feet. Though my own conclusion that the proper length of mineralization is 70 feet closely accords with Judge Mullen's calculation, I reach this figure through a substantially different analysis and one which is actually quite "liberal" in the claimants' favor.

The source of the varying figures as to the length of the medium-grade deposit 3/ resides in the application of a "zone of influence" principle to sample site K. All are in agreement that the zone of influence for sample site K extends approximately 20 feet westerly toward sample site J. The differences arise in the computation of a zone of influence on the east side of sample site K.

The lead opinion, relying on Kemp's analysis, utilizes a zone of influence between sample sites K and M of 152 feet which represents half the distance between these two sample sites (303 feet) 4/ and which results in a

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3/ When I use the phrase "medium grade deposit" in this concurrence, I do not mean to imply that I believe that this mineralization represents a discovery of a valuable mineral deposit as that term is used in mining adjudications. While I agree with my colleagues that the evidence does establish that a mineral deposit exists within that zone (see United States v. Feezor, 74 IBLA 56, 90 I.D. 262 (1983)), I have concluded, for reasons set forth below, that it is not a valuable mineral deposit within the context of the mining laws.

4/ The source of the figure used by the lead opinion for the spatial separation of sites K and M (303 feet) is unclear and I agree with Judge Mullen that a distance of 290 feet more closely corresponds with the record. See Exh. 97. It must be recognized, however, that a certain amount of confusion necessarily arises when correlation of the varying figures used in computing areas of influence both by the parties and my colleagues is attempted. This results from the fact that the Forest Service and appellants each conducted their own sampling program. Thus, Collord, in his 1981 sampling program took 17 samples (denominated as GB 81-1 to GB 81-17). Thurmond, in her sampling program, took 13 samples (denominated as GB 1-1 through 1-6, and GB 2-1 through 2-7). Collord took his samples using as a base station the point we now refer to as sample site K. Thurmond measured her samples from the common endline of the two GB claims, which she located approximately 196 feet west of sample site K. See Exh. G at 15. Thereafter, the parties generally agreed on a correlation of the various sample sites which is indicated in the appendices attached to the lead opinion and to Judge Mullen's dissent. See also Exh. 88.

The problem, however, is that the sampling sites do not exactly overlap and, indeed, could not completely coincide since the distance between sample site K and sample site D shown by Collord is 16 feet shorter than the distance between these two sample sites as indicated by Thurmond. Compare Exh. 97 with Exh. G at 15. Therefore, the distances between any two sampling sites vary depending upon whether Collord's or Thurmond's distances are employed. And, in the course of the testimony below, parties occasionally used both simultaneously. See Tr. 938-89 (where Kemp, in computing the

linear length of 172 feet for the medium-grade deposit, with a corresponding depth of 86 feet. Judge Mullen, for his part, employs a zone of influence for sample site K of 48 feet, which represents half the distance between sample sites K and L (96 feet) resulting in a total linear length of 68 feet and, therefore, a depth of 34 feet for the medium-grade deposit. For my part, I find neither of these approaches justifiable for reasons which go to the heart of the application of the concept of zones of influence.

Unless a sampling program involves sampling along the total strike of an exposed structure, it is always necessary to ascribe some area of influence to any sample. In other words, if an initial sample assays at 1 oz/ton gold, a second sample taken 10 feet further along the strike assays no gold, and a third sample taken 10 feet further assays at 1 oz/ton gold, it will be assumed, for the purpose of computing reserves, that the area of influence for the second sample (no gold) will extend 5 feet toward the first sample and 5 feet toward the third sample. Similarly, if a fourth sample taken 20 feet down the strike from the third sample assayed at 2 oz/ton gold, the area of influence of the third sample would be 5 feet in the direction of the second sample but 10 feet in the direction of the fourth sample. In effect, the linear distance is apportioned between the two samples in determining areas of influence.

Where the distance between sample sites is relatively small and the sites are evenly spaced, application of this concept is both totally proper and results in a significant diminution in sampling costs. But, as the distance between the sample sites increases, the reliability of the inference diminishes accordingly. This is exactly the situation involved with respect to the medium-grade zone. The sampling pattern in the high-grade zone shows a spatial separation of 40 feet between sites D and E, 55 feet between sites E and F, 70 feet between sites F and G, and 15 feet between sites G and H. Thus, the maximum area of influence for any single site is 35 feet in any one direction. The sampling pattern for the medium-grade zone, however, discloses a much different situation. The distance between sites H and I is 65 feet, between sites I and J is 35 feet, between sites J and K is 40 feet, between sites K and L is 96 feet, and between sites L and M is 194 feet. These last two distances are of particular importance. No sample was taken at sample site L by Collord, since it was merely a small pit with the vein not exposed. See Exh. 97. Based on this fact, the lead opinion (as well as Collord and Kemp in their calculations) used the linear distance between site K and site M (290 feet for Collord and Kemp, 303 feet for the lead

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fn. 4 (continued)
length of the medium-grade zone uses the 290-foot distance between sample sites K and M shown on Exh. 97 but then applies a 48-foot distance between sample sites J and K, relying on Thurmond's Exh. G, rather than the 40-foot figure given on Exh. 97).

Since it is impossible to reconcile the varying figures as to distance, I have determined to use the figures shown on Exhibit 97 as representing
the distance between the sample sites. Thus, all distances between sample sites used hereafter are as shown on that exhibit unless otherwise expressly noted.

opinion) to determine the area of influence of site K, resulting in an ascribed area of influence for site K of between 145 to 152 feet. I think that ascribing an area of influence of such magnitude to any single site is simply unjustifiable. 5/

Judge Mullen, while eschewing a 145-foot zone of influence between sample sites K and M, purports to utilize a zone of influence of 48 feet, half the distance between sample sites K and L. But, it would seem to me that a "sample site" in which no samples are taken is really not relevant in determining a zone of influence. There are, indeed, an infinite number of points along the strike of the structure at which samples were not taken. The fact that Collord saw fit to identify one of these in his sampling program scarcely elevates that point to a "sample site."

I recognize that no hard and fast rule can be fostered with respect to the proper area of influence which could be applied to all surface sampling programs, since the proper spacing of sampling sites will be dependent upon the nature of both the vein structure and the mineralization occurring therein. 6/ But, I believe that the results of the program conducted with respect to these two claims show that areas of influence ascribed to any specific sample site should be somewhat constrained. Thus, sample site G showed an average value of 3.06 oz/ton gold, while sample site H, a mere 15 feet away, had an average value of 0.187 oz/ton gold. The dangers inherent in ascribing significant lineal influence to any sample site can be illustrated in the fact that, assuming no sampling had occurred at site H,

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5/ I note that the lead opinion justifies the 145-foot zone of influence between sample sites K and M as consistent with the Montana "Handbook for Small Mining Enterprises" (F. Earll, 1976) which noted that the "area of influence of a sample extends both ways from the sample location halfway to the next sample location." See supra at 274 nn.10 and 11 (citing Exh. 81 at 37). What the lead opinion ignores, however, is that this same Handbook addressed sampling techniques prior to its discussion of zones of influence. Therein, the Handbook noted that:

"Unless the mineralization of a vein deposit is remarkably constant, and in addition is such that its grade can be judged visually with reasonable accuracy, a 25-ft. sample spacing would be maximum for safe estimation of reserve. The average spotty base-metal vein will require sampling spaced 10 to 15 ft. apart, and many gold and silver veins require samples spaced as close as 5 ft."

(Exh. 81 at 35). When the Handbook later discussed zones of influence, it is, of course, assuming that the samples were taken in accordance with these principles and not that samples were taken almost 300 feet apart.

6/ As is noted in the SME Mining Engineering Handbook, Vol. 2 at 32-10 (1973):

"Samples should be taken at sufficiently close intervals to leave little leeway for any extreme variation to go unnoticed. The number and size of the samples required, therefore, will be dependent upon the nature of the particular deposit. In epigenetic metalliferous deposits in vein or lode class, samples rarely need to be taken at intervals of less than 5 ft, as measured along the strike of the structure."

the area of influence ascribed to site G would have been 40 feet (one-half the distance between site G and site I), which, in effect, would posit values at site H more than 15 times greater than those disclosed by actual sampling.

Faced with the clear volatility of values shown along the strike of the structure, I do not think that we would be justified in ascribing an area of influence greater than 50 feet in any direction from a single sample site. This, I would submit, is an extremely "liberal" interpretation of the data in appellants' favor since, as indicated above, the variability in values otherwise disclosed would generally make sampling at 100-foot intervals extremely unreliable on this structure and a 50-foot zone of influence is, in fact, 20 feet greater than any other zone of influence being used herein. Applying a 50-foot zone of influence would decrease the area of influence which the lead opinion ascribed to site K by 102 feet and result (with the addition of a 20-foot zone of influence toward sample site J) in a total strike length of medium-grade mineral of 70 feet. Volumetric computation
of mineralization (Length x Depth [1/2 length] x Width [2.1 feet] ÷ 12.5 [cu. ft. per ton]) produces a total mineralized tonnage of 412 tons of medium-grade mineralization.

The next question which is relevant with respect to the marketability of the medium-grade mineralized zone is the determination of the grade of the mineralization in the zone. Both the lead opinion and Judge Mullen agree on a grade of 0.412 oz/ton. With due respect for my colleagues, I do not think this figure can be justified.

A total of 10 samples were taken at sample site K. Of these, two were taken of the footwall and one was taken from the hanging wall. The assays for these three samples (GB 81-3, 4006, and 4004) were 0.004 oz/ton, trace, and trace, respectively. While these samples were useful in determining that there were minimal values outside of the vein, I agree with my colleagues that they should not be considered in determining the amount of mineralization within the vein. The seven remaining samples assayed as fol-lows: GB 2-1 (0.675); GB 2-2 (0.160); 1401 (0.513); 1402 (0.546); GB 81-1 (0.552); GB 81-2 (0.026); and 4005 (0.010). The numeric average of these assays is 0.355 oz/ton, rather than 0.412 oz/ton, the figure used by my colleagues.

It is obvious that my colleagues have seen fit to ignore sample
No. 4005 in determining a grade for the medium-grade zone. Why they have done so, however, is neither obvious nor explained. It may be that they simply relied upon the averages used by Kemp in his calculations. See, e.g., Exh. 61, Table. However, Kemp's averages included only GB 2-1 and GB 2-2 of the Forest Service samples since only those two samples were included in Thurmond's October report, upon which Kemp relied in making
his calculations. While Kemp subsequently criticized the failure of the report to include sample No. 4005 (Tr. 965-69), he did not suggest that
the assay result for this sample was not entitled to equal weight with

the other assay results at site K. 7/ And, in point of fact, inclusion of that sample, with the attendant lowering of the average value to 0.355 oz/ton, brings the average value more into line with the results of Kemp's bulk sampling assays (0.340 oz/ton), which, Kemp argued, more closely reflected actual values since they avoided the "nugget effect." See Exh. 59 at 7; Exh. 61 at 2-4; Tr. 925-26, 986-88. Even if my colleagues choose to ignore the results of Kemp's bulk sampling, there is no reason not to use a true numerical average of the samples taken on the vein at sample site K. Accordingly, I will use the numerical average of 0.355 oz/ton in making my computations of value with respect to the medium-grade zone.

From the foregoing, it is a relatively simple matter to compute the amount of mineralization presumed to exist within the medium-grade zone. Assuming a 412-ton deposit with an average grade of 0.355 oz/ton, the

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7/ The samples included in Exhibit G were taken during an examination of the claims in June 1985. Thurmond testified that she took additional sam-ples, including sample No. 4005, on Sept. 3, 1986. Thurmond explained that the 1986 samples were taken after her report had been transmitted for review and, accordingly, were not included therein. See Tr. 151-52. I recongize that Judge Mullen, in his dissent, asserts that sample No. 4005 was taken from wall rock and, in support of this assertion, refers to the above-referenced testimony. He declares that "When asked '[c]an you identify which samples were of wall rock by Sample No?,' (id.) [Thurmond] identified sample Nos. 4000 through 4006." Infra at 349 n.27. In point of fact, the following is a verbatim replication of the transcript of this exchange:

"Q. [By Benson] How many samples did you take?

"A. I believe I took seven samples at that time.

"Q. Were they all of wall rock?

"A. No.

"Q. Okay. Can you identify which samples were of wall rock by Sample No?

"A. Sample No. 4000 is from the vein material, sample No. 4001 was from the hanging wall, Sample No. 4002 was from vein material, from a small vein which had split off the main vein. Sample 4003 was from the foot wall and also included about four inches of vein material which had not been included in the previous sample. Sample No. 4004 was from another location and was in the hanging wall at that location. Sample No. 4005 was at the same location and was vein material, and Sample No. 4006 was from the same location, in a foot wall."

(Tr. 131-32). Thus, Thurmond explicitly identified sample Nos. 4000, 4002, and 4005 as "vein material," clearly differentiating these samples from No. 4003 which was taken from a footwall but "included about 4 inches of vein material."

Moreover, since Judge Mullen used a numeric average in his own analysis, weighting the sample values for areas of influence but not for length of individual samples at the various sites (see dissent infra at 349), the fact that no sample length was provided for sample No. 4005 should be irrelevant for the purposes of his calculations.

total mineralization in place would be 146.26 ounces of gold, with a total value of $55,798 (at $381.50 per oz.) or $48,362 (at $330.66 per oz.). The oz/ton value of the mineral deposit at the two prices for gold would be $136 and $117, respectively. The ultimate question, of course, is whether these values would justify a prudent man in the further expenditure of his labor and means with a reasonable prospect of success in developing a paying mine. And preliminary to that determination, it is necessary to ascertain the reasonable costs of mining. Before embarking upon that analysis, however, I think it important to discuss two discrete concepts which, I believe, are necessarily involved in the proper determination of applicable cost factors. The first of these two concepts is generally referred to as the "independent mine" theory, and the second I will refer to as the "best case scenario" technique of adjudication. As I shall attempt to show, differences in approach to the "independent mine" theory are the theoretical underpinning of the conflict between the lead opinion and Judge Mullen's dissent, while elements of the "best case scenario" approach, an approach which is, to my mind, based on a faulty burden of proof analysis, thread their way through both opinions. I will discuss these two matters seriatim.

The "independent mine" rule can be easily encapsulized: where a group of mining claims is, or will be, developed as a single entity, a mining claimant need not establish that each claim has a reasonable prospect of independently supporting an economically viable mine; rather, the mining claimant must show that a valuable mineral deposit is disclosed on each of the claims and that there is sufficient quantity and quality of mineral to warrant development of all of the mining claims as a group with a reasonable prospect of success in developing a paying mine. See, e.g., United States v. New York Mines, Inc., 105 IBLA 171, 191, 95 I.D. 223, 234-35 (1988); United States v. Foresyth, 100 IBLA 185, 248-50, 94 I.D. 453, 488-89 (1987); Schlosser v. Pierce, 92 IBLA 109, 129-34, 93 I.D. 211, 222-25 (1986). Though this analysis originated in the context of low-grade disseminated deposits of minerals where absorption of necessary development costs was only possible if a sufficiently large quantity of ore could be shown to exist, it has, indeed, been invoked in cases involving vein deposits of gold. See United States v. New York Mines, Inc., supra. Thus, its application within to the present fact situation does not represent any radical departure from our past precedents.

What the present case does reveal, however, is a subsidiary issue that arises in the application of the "independent mine rule" which, while occasionally alluded to in the past, has not, heretofore, been squarely faced. The prior decisions of the Board have focussed on the broad question of whether a claimant can establish that a discovery exists by developing a single mine for multiple claims. The present case presents the issue of, assuming that such a showing has been made, how one determines which claims benefit therefrom.

It is obvious that the mere fact that a mining claimant has included any specific claim within a group of claims which can be mined at a profit in a combined endeavor does not control the determination as to the validity

of that claim. Thus, individual claims might contain no evidence of mineralization or such spotty mineralization that no one would suggest that these were valid locations. Clearly, to be valid, each mining claim must possess sufficient mineralization so that it could be concluded that that claim contributes to the overall profitability of the endeavor. There are, however, two totally differing approaches (with radically varying results) that can be utilized in determining the relative contribution of each claim. Indeed, much of the apparent conflict between the results reached by the lead opinion and by Judge Mullen is directly related to the fact that they have embraced opposing approaches in resolving this question.

The first approach, exemplified by the lead opinion, is the "pro rata" method of cost allocation. Under this approach, one first determines the unit value of each deposit within each mining claim and then subtracts from this figure the unit cost of production. Thus, by way of example, if there are three claims (A, B, and C) containing mineralization with a unit value of $350, $250, and $100 per ton, respectively, a determination that the unit cost of production was $175 per ton would result in a finding of validity for claims A and B, and a concomitant finding that claim C was invalid. In effect, costs are apportioned to all claims based on the mineralized tonnage presumed to exist thereon and those for which the apportioned cost of production exceeds the value of the mineralization would be deemed to be invalid.

The second approach, embraced by Judge Mullen in his dissent, is one which I will refer to as the "carrier" method of cost allocation. Under this approach, once it can be shown that either a single claim or a subgroup of the claims in the claim group can absorb or "carry" all the infrastructure costs (roads, tunnels, millsites, etc.) of claim development, other claims must merely show that they can recover their direct mining costs in order to be deemed valid. 8/ This analysis proceeds on the assumption that since the general infrastructure costs would be incurred in the development of the carrier claim or group of claims, regardless of whether or not other claims were developed, the profitability of those latter claims may be determined without reference to any of the infrastructure costs

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8/ That this is the approach being utilized by Judge Mullen is obvious when one analyzes the final charts in his dissent. Thus, the only costs being assessed against the medium-grade deposit (Zone 1-B) are $11,000 for direct mining costs, $11,000 for direct milling costs, and $12,000 for maintenance of the road and reclamation costs deemed dependent solely on
the development of the medium-grade zone. In fact, by assuming that both deposits would be mined by a tunnel commencing to the east of the medium-grade zone, Judge Mullen has actually avoided charging the medium-grade
zone for any of the tunnelling costs underneath GB-2, assessing those
costs to the high-grade deposit on GB-1. And, since Judge Mullen also argues that the tunnelling will result in actual mining of that part of
the deposit through which it passes, he is, in effect, even charging some
of the actual costs of mining the medium-grade zone to the high-grade deposit. This aspect of Judge Mullen's analysis is discussed in greater detail subsequently in the text of this concurrence.

expended in developing the initial claim or claims. In effect, the one claim or subgroup of claims "carries" the others.

It seems to me that each approach has points in its behalf. Thus, the "pro rata" analysis is premised on the apperception that Congress intended to permit the acquisition of title to lands which contained a valuable mineral deposit. A mineral deposit which cannot bear even its aliquot production costs in a group mining venture simply does not constitute the type of discovery which Congress sought to reward when it permitted a successful locator to purchase the land within a mining claim. And there is implicit support for this approach in the oft-repeated holding that, while each claim may not be required to support a paying mine, each valid claim must be supported by a discovery of a valuable mineral deposit within its boundaries. See, e.g., Ranchers Exploration & Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); United States v. White, 118 IBLA 266, 98 I.D. 129 (1991); United States v. Williamson, 45 IBLA 264, 87 I.D. 34 (1980).

On the other hand, the "carrier" theory is grounded in the proposition that, since the claimant will, in any event, absorb certain fixed costs in mining the core deposits, a prudent miner would subsequently take the existence of those improvements into account in determining whether or not he would continue to mine after the core or carrier deposit is depleted. In effect, having already made those expenditures in the course of developing a successful mine, the miner would treat these costs as already paid for and concern himself only with the determination of whether other deposits could be mined at a profit, given the existing infrastructure. He would not concern himself with whether or not the deposit could pay its aliquot share of those expenditures since he would view those expenditures as already accounted for.

The only Board precedent which even arguably touches upon this conflict is United States v. Mannix, 50 IBLA 110 (1980). 9/ In that case, the Forest Service argued, inter alia, that, as a precondition to establishing the validity of two claims, the claimants were required to show that the successful mining of the mineral deposit therein disclosed would cover the costs of the construction of an extensive underground tunnel system already in existence on the claims. In rejecting this argument, the Board declared that "[a]bsent a withdrawal, if the mineral material may be now mined, removed, and marketed at a present profit over and above the costs of such operations, we would hold that the requirements of discovery have been met." Id. at 119.

9/ While, admittedly, the decision in Schlosser v. Pierce, supra at 131-32, 93 I.D. at 224, cited with approval the earlier decision of the Board In re Pacific Coast Molybdenum Co., 75 IBLA 16, 90 I.D. 352 (1983), and noted that in that decision "[c]osts for developing a single mine were estimated and apportioned to each claim according to the estimated tonnage of material to ascertain the profitability of each claim," there was no real analysis of the problem delineated in the text of this concurrence.

While not clearly explained, the non-existence of a withdrawal was critical to the Board's ruling in the Mannix case. The claimants in Mannix had, in fact, made substantial expenditures in developing the underground workings, expenditures which, quite frankly, would never be recouped even if they successfully mined the deposit disclosed in the evidentiary record.
Obviously, with the benefit of hindsight, no prudent man would have proceeded to construct the underground workings and, absent these workings, a prudent man would clearly not have been justified in the further expenditure of his labor and means with a reasonable prospect of success in developing
a paying mine. It could, therefore, have been argued with some force that these claims were not valid since there was virtually no chance that a paying mine (one which would recoup all of the claimants' expenditures) would result.

The Board declined to invalidate the claims, however, because the land was not withdrawn. In essence, the Board reasoned that while it might be argued that the specific claims at issue were invalid, nothing would prevent the appellants from relocating new claims upon the receipt of the Board's decision. Such new claims, however, would not be burdened with the necessity of recouping past expenditures made under prior locations. Rather, they would merely be required to show, in the words of the Board, that "the mineral may be now mined, removed, and marketed at a present profit over and above the costs of such operations." In effect bowing to practicality, the Board determined that, so long as the land remained presently open to mineral location, where expenditures which might properly be seen as imprudent had already been incurred, a mining claimant could show the existence of a valuable mineral deposit without establishing that those already-made expenditures would be recovered.

A different result, however, would have obtained had the land embraced by the claim been withdrawn from mineral entry. In such a situation, the practical concerns which had animated the Board's determination would not have arisen. Since no future location could be made, there would be no essential unfairness to the locator in determining whether a prudent man would have been justified in making the original location under review therein, in light of the expenditures both anticipated and already incurred. 10/

Admittedly, there are differences between the fact situation herein and that examined in Mannix. Thus, in the instant case, none of the expenditures have been made whereas in Mannix they had occurred prior to the hearing. Moreover, in Mannix there was no withdrawal of the land, whereas in the instant case the land has been withdrawn from mineral entry. On

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10/ I recognize, of course, that the explanation of the rationale underlying the Mannix case presented herein goes far beyond that actually provided in the text of that decision. Issuance of that decision, however, was preceded by lengthy discussions within the panel and the explanation provided in the text of this concurrence does, I believe, do justice to
the understanding of the panel which issued that decision.

the other hand, while in Mannix neither of the claims would have justified the construction of the underground workings, herein the GB-1 would justify development of that claim. The similarity, however, resides in the fact that both the Mannix claims and the GB-2 claim could only be successfully mined if the necessary infrastructure is taken as a given and not assessed against the ultimate return to those claims. The question is how these differences and similarities impact upon the ultimate question of discovery herein.

While not totally free from doubt, I have concluded that the critical distinguishing factor in this case is that the expenditures relating to infrastructure development have not yet been made. In effect, we are faced with a case in which if appellants mine the deposit within GB-1 it may be possible thereafter to mine the deposit within GB-2. The ultimate validity of the GB-2 claim is therefore dependent upon the future actions of appellants which may or may not take place. 11/ Appellants, however, as proponents of the application for patent, are required to show, by a preponderance of the evidence, that the GB-2 claim is presently valuable, not merely that it might be valuable in the future upon the occurrence of certain events, i.e., development of the GB-1 claim. See In re Pacific Coast Molybdenum Co., 75 IBLA 16, 29-30, 90 I.D. 352, 360 (1983).

I would conclude that, in those situations in which a mining claimant has already constructed the infrastructure necessary to mine multiple claims and can show that these costs will be recovered from either a single claim or a subgroup of those claims, the claimant need not establish that the pro rata costs of these workings can be borne by the production from other claims. So long as these latter claims can show a profit over their operating costs, they exhibit the present value required for a valid mining claim. Where, however, as in the instant case, the infrastructure expenditures have not yet been made, a claimant can show, as a present fact, the value of each claim only by establishing that each claim can cover both the direct costs of mining it and its pro rata share of anticipated development and infrastructure costs. Barring such a showing, the claim cannot be said to contain a valuable mineral deposit within the meaning of the mining laws.

A review of the record developed below makes it obvious that, under this standard, the GB-2 claim is not supported by a discovery regardless of whether one utilizes the cost figures of the lead opinion or of the dissent. 12/ But, I would submit, the record is equally clear that, notwithstanding Judge Mullen's titanic efforts, appellants have simply failed to

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11/ I make this statement without any intent to disparage appellants' bona fides but merely in recognition of the legal reality that, once patent has been obtained, there is absolutely no legal requirement, whatsoever, to proceed in the actual development of a valuable mine.

12/ As noted above, the per-ton value of the mineralization in the medium-grade zone varies from $117 to $135, computed at a grade of 0.355 oz/ton gold. Assuming, arguendo, a grade of 0.412 oz/ton gold (the value ascribed to the medium grade by the lead opinion and Judge Mullen), the per-ton value

show by a preponderance of the credible evidence that they have a reasonable likelihood of success in developing a profitable mining venture with respect to the GB-2 claim, even assuming that only direct operating costs need be recovered from that venture.

Prior to commencing my critique of Judge Mullen's cost analysis, I wish to first advert to an approach to mining claim adjudication which has increasingly been appearing in Board decisions and which, I would suggest, effectively distorts the proper standard of consideration which this Board is charged with applying. For some time now, in those situations in which the Board has been confronted with conflicting evidence as to costs (and, to a lesser extent, rates of mineral recovery), the Board has exhibited a proclivity to eschew a determination as to which figures the Board believes are best supported in the record and, instead, to proceed to analyze the record under, what I shall term, the "best case" scenario. In this approach, the Board will generally point out that "even if" we take the figures most favorable to a claimant (his "best case"), the claims could not be developed with a reasonable likelihood of ultimate success.

In one sense, I recognize the utility of this approach since it can obviate the need to engage in a detailed analysis of differing cost estimates in those situations in which it simply makes no difference which cost figures are utilized. But, as I shall show, there is a very real danger to this approach in those cases where, under the "best case" scenario, it

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fn. 12 (continued)
of the mineralization would vary between $136 to $157. The lead opinion concludes that total per-ton costs for mining both deposits would be $180, while Judge Mullen's dissent suggests that the per-ton cost of mining both deposits would be $194 [$431,000 in total costs ÷ 2,224 total mineralized tonnage in Zone 1-A and Zone 1-B]. Thus, the pro-rata costs of mining the medium-grade deposit could not be met under either set of figures. And, I would submit, the lead opinion substantially understates per-ton costs because of its reliance on an excessive zone of influence between sample sites K and M, which results in increased total tonnage and a correspondingly lower per-ton cost estimate. See note 15, below.

Moreover, I believe that Judge Mullen significantly understates tunnelling costs. Thus, Judge Mullen's tunnelling figures presume an 8-foot height and an 8-foot mining width and, therefore, 5.1 tons of material must be removed for each lateral foot of tunnel ((8 x 8 x 1) ÷ 12.5). In effect, Judge Mullen concludes that tunnelling (and associated mining of the mineralized zone) can proceed for direct costs of only $16.50 per ton, over $21 per ton cheaper than the direct costs of resuing and, in fact, over $9 less than merely the labor costs of resuing. I simply do not believe that there is any support in the record for such a cost estimate. More-over, insofar as the mining associated with construction of the tunnel is concerned, the driving of a tunnel of the suggested dimensions results in a waste to ore ratio of 3 to 1, which would invalidate reliance on the Bureau of Mines direct mining cost estimates since that estimate had presumed a 1 to 1 ratio. See Exh. 85 at 1.

is arguable whether mining might be successful. Reliance on the "best case" analysis has the potential for distorting Board adjudications in two varying, but equally objectionable ways.

Thus, the potential exists for the Board to confuse the fact that a claimant can show that there is a possibility of success under the "best case" scenario with the adjudicatory requirement that, once the issue of discovery has been placed into controversy, the claimant must show, by a preponderance of the evidence, that there is a reasonable likelihood that a paying mine could be established. The obvious flaw in this approach is that the equation of the existence of a "possibility" of success to the establishment of the reasonable "likelihood" of success effectively results in a shift of the ultimate burden of proof from the claimant to the Government, requiring the Government to negate the existence of every such possibility, a requirement which simply does not, and should not, exist. While I do not believe that this mis-analysis has been manifested in any ultimately dispositive opinion of the Board, I do fear that such an approach is, at least, foreshadowed in the dissenting opinions filed in the instant case.

What at least one recent adjudication has actually disclosed, however, is a willingness by the Board, when confronted with a "possibility" of success whose "likelihood" is dependent upon which set of cost or value factors are utilized, to conclude that, because conflicting evidence exists, another hearing is necessary to resolve the matter. See, e.g., United States v. American Independence Mines & Minerals, 122 IBLA 177, 188-89 (1992). It seems to me that, at a minimum, this is the position advocated by Judges Mullen and Irwin herein. To my mind, however, this approach is no more than the embrace of a phantom, a search for some type of Platonic "ideal" which simply does not exist. 13/ And, I fear, it finds its roots not so much in the lack of sufficient evidence to resolve factual conflicts as in an unwillingness to make the difficult adjudications which are, after all, our ultimate responsibility. This Board is not charged with resolving conflicts in such a manner that all of the parties agree with its conclusions. That would often be an impossibility. The Board is merely charged with resolving those conflicts to the best of its ability, in a manner which it deems most in accord with the weight of the evidence. In its zeal to avoid error, the Board increasingly avoids making any decision at all. We have all of the facts we need to adjudicate the instant appeal. It is time to decide this case.

In reviewing the cost analyses presented in Judge Mullen's dissent (and, to a lesser extent, in the lead opinion, as well) it is important to recognize that the selected cost factors represent, by and large, an amal-gam of the "lowest" costs presented by all of the witnesses. 14/ They, in

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13/ And, I would suggest, this Board's experience with the adjudication of appeals after they have been remanded for further hearings should give the lie to any assertion that additional hearings generally serve to resolve factual matters in conflict.

14/ Indeed, no place is the culled nature of the cost projections more apparent than in the use by both the dissent and the lead opinion of

reality, embody the "best case" which can possibly be made for the validity of claim GB-2. 15/ They do not, however, necessarily or even probably represent the likely cost figures which development would entail. Thus, even if I agreed that a profit might be possible under the mining scenario and cost analysis presented in the dissent, this would, at best, merely establish that the development of a successful mine is not impossible given the best of all possible worlds. The mere fact that something is not impossible, however, does not make its occurrence likely. 16/

In any event, I believe Judge Mullen's analysis is flawed in a number of critical aspects. While I would dispute a number of Judge Mullen's cost selections for various elements of development, I will, for the sake of argument, assume the correctness of all of Judge Mullen's estimates as to costs. 17/ Notwithstanding reliance on these figures, however, I believe

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fn. 14 (continued)
Thurmond's estimates for the costs of running an adit and raises ($84 per foot). This is the only instance in which either opinion relies upon any
of Thurmond's cost estimates and, I would suggest, it is no accident that, for this cost, Thurmond's figure is lower than every other estimate. Thus, Collord's own cost estimates were $100 per foot for the access drift, $110 per foot for drifts along the vein, and $125 per foot for raises. See Exh. 66A at 24. The Bureau of Mines study, upon which Judge Mullen relies for his direct mining and milling costs, used a figure of $95.92 per foot of development drift and $92.52 per foot for raises. See Exh. 85 at 6. And, Thurmond, herself, testified that, while she had applied a development cost of $84 per foot for drifts and raises "[c]onversation since then with other professionals in the field have indicated that this is probably very low; that, in fact, this cost would be in the neighborhood of $200 per foot and possibly even $300 per foot, considering the remoteness of the area and total lack of any development features on the claims." See Tr. 139. In effect, both the lead opinion and the dissent embrace a cost estimate for development which was not supported by a single expert who testified.

15/ It will, of course, be observed that the lead opinion's per-ton cost figure ($180/ton) is actually lower than that derived in the dissent ($194/ton). This, however, is directly related to the zone of influence which the lead opinion applied to sample site K, which has the effect of increasing mineralized tonnage over the figure employed both by Judge Mullen and this concurrence (2,603 tons for the lead opinion versus 370 tons for Judge Mullen and 412 tons under my own calculations). This has the effect of lowering per-ton costs since the fixed development and capital costs would be spread out over a greater tonnage figure. It also results, however, in a reciprocal decline in the per ton value of total production since it significantly increases the ratio of medium-grade to high-grade production.

16/ Thus, every purchaser of a lottery ticket has the possibility of success in the drawing, but no one would suggest that a holder of a single ticket has a reasonable prospect or likelihood of becoming a millionaire.

17/ I do, however, wish to record my objection to so much of both the dissent and, particularly, the lead opinion which premises the determination
of milling costs on the assumption that milling will occur at the millsites.

that an analysis of Judge Mullen's proposal 18/ makes it clear that there is no reasonable likelihood or even possibility of success in attempting to mine the medium-grade zone located on GB-2, even in conjunction with the high-grade deposit on the GB-1 claim.

The theoretical basis of Judge Mullen's analysis is the assumption that if the possible profits of mining both the medium- and high-grade deposits exceed those obtained from mining only the high-grade deposit, 19/ a prudent man would be justified in mining both. Leaving aside, for the moment, the conclusion reached above that where infrastructure costs have not yet been made each mineralized ton must carry its pro rata share of those costs, I will accept Judge Mullen's assumption as a basis for analysis. In order to determine whether or not a greater profit could be realized from both deposits, Judge Mullen first develops cost figures for mining the GB-1 deposit. It is here that I believe Judge Mullen makes a critical error.

As described in his dissent, Judge Mullen envisions that mining of the GB-1 deposit would commence from a point roughly 70 feet east of the zone of influence of sample site K, entering the zone at the projected depth of the medium-grade deposit (34 feet). The drift would continue 68 feet through the medium-grade deposit and then continue approximately 128 feet before encountering the high-grade zone (at a presumed depth of 76 feet), continuing 153 feet through that zone and an additional 10 feet for a tail drift. However, as explained below, whatever utility this proposal may have in determining whether one would mine both zones, it seems to me beyond cavil that an individual attempting to mine only the high-grade zone would not pursue the mining scenario suggested in the dissent.

Thus, Judge Mullen's proposal requires the driving of an adit a total of 266 feet merely to intersect the high-grade deposit. But, as suggested by both the lead opinion and E. J. Collord, the shortest path to the high-grade deposit would be through a cross-cut driven from a point south of the high-grade mineralization. An analysis of Exhibit 88 indicates that from a portal constructed south of this deposit, an adit could be driven 175 feet

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fn. 17 (continued)
The simple fact of the matter is that, for factors independent of the validity of the associated mining claims, the Board is herein declaring the millsite claims invalid. This being the case, an economic analysis which proceeds under the assumption that a nearby millsite will be available when, in point of fact, it is clear that the millsite will not be available, is
an economic analysis premised in fiction, not reality.

18/ The suggestion that appellants would mine the GB-1 deposit through an adit driven westerly from a point 70 feet east of the medium-grade deposit on the GB-2 does not appear in the record. Rather, it arises solely in Judge Mullen's dissent.

19/ Admittedly, both Judge Mullen and the lead opinion explore the possi- bility of only mining the medium-grade deposit. It light of the overwhelming evidence that such an attempt would be economic folly, this prospect need not detain us.

north 20/ and intersect the mineralized vein at the required depth. This would obviate the need for the construction of 91 feet of tunnel, with a projected savings of slightly more than $7,600, even at the rate of $84
per foot for tunnelling used in Judge Mullen's computations. But see n.14, supra. Since this is a savings that will be lost by mining both deposits in the manner proposed by Judge Mullen, this amount must be subtracted from any net profit (i.e., the profit over and above that which is obtained by mining only the high-grade zone), which might be obtained by mining both of these zones. Thus, Judge Mullen's projected profit of $15,000 (at $381.50 oz/gold) or $8,500 (at $330.66 oz/gold) attributable to mining the medium-grade deposit declines to a maximum profit from $7,400 (at $381.50 oz/gold) to merely $900 (at $330.66 oz/gold) merely correcting for this factor alone. 21/

Moreover, driving a tunnel directly to the high-grade zone would result in significant savings during mining. Thus, under the dissent's scenario, all of the mining operations on the GB-1 would occur between a minimum distance of 266 feet and a maximum distance of 420 feet from the portal. Conducting mining operations from a portal located south of that zone would permit mining operations to occur at a minimum distance of 175 feet and a maximum distance of 253 feet (if the cross-cut intersects the vein midway
in its mineralization). This would result in a substantial time savings both in accessing the mine face and in removing ore, a time savings which ultimately would result in lower mining costs, an additional factor to be considered in assessing the profitability of mining pursuant to Judge Mullen's plan.

In any event, there is a technical problem in the mining approach advocated by Judge Mullen which, I believe, removes any doubt which might yet linger that development of the GB-2 claim cannot, on the basis of the

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20/ While Collord proffered the figure of 150 feet (see Tr. 1125) and the lead opinion apparently relied on his estimate, given the 60° southerly slope of the hill and the fact that the dip of the vein appears to be almost perpendicular to that slope (see Exh. 88), I have calculated that
in order to drive a horizontal cross-cut which would intersect the vein at the 78-foot depth the adit would have to be driven a distance of 175 feet. While I have used my computation rather than Collord's, it should be pointed
out that, in the context of determining the possibility of mining the GB-2, the greater distance is actually the more "liberal" in the claimants' favor since it increases the cost of the cross-cut and thereby lessens the amount of money which must be offset against Judge Mullen's proposed development plan.

21/ This computation assumes that the grade of the deposit is 0.412 oz/ton gold rather than the figure of 0.355 oz/ton gold which I believe is warranted by the record. Use of the 0.355 grade results in either a projected profit of $2,000 or a projected loss of $4,600 depending on the value of gold used in the computation. Moreover, use of the Bureau of Mines' tunnel and raise estimates (Exh. 85) would lower the maximum profit to $6,000 and use of the E. J. Collord estimates would suggest a maximum profit of $3,000, even assuming a grade of 0.412 oz/ton and a gold value of $381.50 per ounce.

record before the Board, be successfully pursued. Judge Mullen assumes, consistent with the record before us, that the resuing method of mining will be used in mining both the high-grade and the medium-grade deposit, stoping upwards from the bottom of the mineralized area. He also assumes that the tunnel will intersect the bottom of each mineralized area. The problem, however, is that the projected depth of the medium-grade deposit is 34 feet whereas the projected depth of the high-grade deposit is 76 feet. Inasmuch as both deposits are at roughly the same surface elevation, a horizontal drift along the vein which intersects the bottom of the medium-grade deposit will also intersect the high-grade deposit at approximately the same depth. This, however, would place the tunnel roughly 42 feet above the bottom of the high-grade mineralization and reduce, by more than half, the amount of high-grade tonnage which could be mined through resuing.

Attempting to resolve this problem by angling the tunnel downward after it passes beneath the medium-grade deposit would not only result in a lengthening of the tunnel, but it would also require a grade in excess of 30° for that segment of the tunnel separating the high-grade mineralization from the medium-grade mineralization. And, since Judge Mullen's mining plan envisions that the ore will be removed through the tunnel, this would necessitate the physical movement of a 1-ton mine car up this incline, a not insignificant problem. 22/ If one attempts to avoid this last problem by initially driving the adit at a depth of 76 feet this would require that the portal be located considerably further east thereby increasing the cost of the tunnel by increasing its length. More importantly, since this would eventually require the mining of 42 feet of presumed waste before encountering the medium-grade deposit, it would clearly make the mining of that deposit uneconomic. Finally, any attempt to mine the two deposits through separate adits would also fail since this would require the medium-grade zone to bear all of its tunnelling costs, which it simply cannot do under the parameters guiding our analysis. It seems to me crystal clear that appellants have failed to establish a reasonable likelihood of success in the development of the GB-2 claim under any scenario.

From the foregoing, it appears obvious to me that appellants have simply failed to establish an arguable possibility, much less a reasonable likelihood, that the medium-grade deposit located on the GB-2 claim could be developed. This is true regardless of whether or not one assesses that deposit its pro rata share of capital and infrastructure expenditures (as I believe is required under the facts of this case) or whether one allows the GB-1 claim to carry these costs. 23/ On the record submitted for our

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22/ E. J. Collord's capital costs, on which the dissent relies, omitted any expenditure for a locomotive, which Thurmond had, in her February 1986 report, estimated would cost $37,500. Compare Exh. 66A at 29 with Exh. 73A at 31.

23/ Even ignoring the problems delineated above and taking Judge Mullen's figures at face value, it is difficult to see how a prudent man would be justified in the difficult and risky attempt to develop a successful mine on the GB-2 claim when the net profit achievable, assuming the most rosy outlook, is between $8,500 and $15,000.

review, I believe that the conclusion is inescapable that appellants have failed to establish by a preponderance of the evidence a reasonable likelihood of success in efforts to mine the GB-2 claim.

I note that appellants have, since the completion of the hearing, submitted another cost analysis prepared by the Bureau of Mines and have requested that we take it into consideration in adjudicating this appeal. The lead opinion correctly notes that the applicable regulations require that the record made at the hearing serve as the basis for our consideration, except to the extent that official notice may be taken. See 43 CFR 4.24. Unlike the lead opinion, however, it seems to me that the Bureau of Mines' report is not such a public record of the Department as we might take official notice. See generally David Cavanagh, 89 IBLA 285, 92 I.D. 564 (1985); B. J. Toohey, 88 IBLA 66, 92 I.D. 317 (1985). Thus, consistent with our precedents, our review of that report is limited to the consideration of whether or not it would warrant remanding the case for further hearings. See, e.g., United States v. Aiken Builders Products (On Reconsideration), 102 IBLA 70, 79 (1988), and cases cited. I see nothing in that report which would even remotely justify that course of action.

Leaving aside the fact that appellants have not even requested a further hearing, a review of the report fails to provide any new evidence supportive of the validity of the GB-2 claim. While additional samples were taken, none of these occurred at or near sample site K, and, in fact, the majority of the samples taken by the Bureau of Mines actually assayed at less than medium value of other samples taken at those sites. See Bureau of Mines 1990 Report at 7, Fig. 4. Judge Irwin, however, suggests that, because the report concludes that a single vein structure exists with a length of 1,200 feet and a projected depth of 600 to 650 feet, that this somehow makes the lead opinion approach "dubious."

The simple fact of the matter, however, is that the Bureau of Mines' 1990 report is merely cumulative of evidence already in the record. Its failings are clearly delineated in Judge Mullen's analysis of the differ-ence between a mineral resource and a mineral reserve and the geological projections which may properly be brought to bear with respect to these discrete concepts. Indeed, Judge Mullen accepts (as do I) the proposition that an inferred resource averaging 2 feet in width, extending 1,200 to 1,300 feet in length, and projected to a depth of not less than 600 feet exists. As Judge Mullen convincingly demonstrates, however, there are substantial differences between an "inferred mineral resource," an "indicated mineral resource," and "mineral reserves." Thus, Judge Mullen concludes that there are two blocks of indicated mineral resource (460 feet x 230 feet x 2 feet and 210 feet x 105 feet x 2 feet) which, while all parties agreed were not mineable in their entirety, contained areas of mineralization which might be amenable to development. These areas, which he described as Zone 1-A and Zone 1-B, were the points which Judge Mullen examined to determine whether or not they could be classified as reserves. The Bureau of Mines report simply treated the inferred mineral resource as an indicated mineral resource and then assumed that all of this constituted mineral reserves. This approach is, as shown by Judge Mullen, simply not sustainable on the present record.

It is true that Judge Mullen concluded that both Zone 1-A and Zone 1-B could be classified as mineral reserves, while both this concurrence and
the lead opinion reached a different conclusion with respect to Zone 1-B. But every opinion filed herein, with the apparent exception of Judge Irwin, accepts the proposition that, for the purpose of determining the existence of a discovery, where surface mineralization has been shown to exist (i.e., a mineral deposit) but there is an absence of subsurface sampling corroborative of the continuation of these values below the surface, geologic inference may be used to project the subsurface continuation of the mineral deposit for only one-half the length of the surface mineralization. Any projection beyond this depth would correctly be viewed as an "inferred resource" which is not properly considered in determining whether appellants have established a discovery under the mining laws.

Moreover, to the extent that Judge Irwin places any reliance on the assumption that the Bureau of Mines report would support the conclusion that the medium-grade deposit could be economically mined, this reliance is misplaced. Two scenarios were analyzed by the report. The first was limited to the high-grade zone whereas the second embraced both the high- grade and the medium-grade zones. See 1990 Bureau of Mines Report at Tables 5 and 6. Table 5 indicated a cumulative net cash flow of $390,358 over a 5-year period. Table 6 indicated a cumulative net cash flow of $1,611,900 over a 15-year period. However, the Bureau of Mines utilized two different sets of assumptions in preparing these analyses. For the original high-grade zone mining plan, it assumed a depth of 232 feet for the mineralized area. In computing the combined mining plan, however, it assumed a depth of 600 feet. If this last assumption were applied to the mining of only the high-grade zone, there would be a net cumulative cash flow, after 10 years, of approximately $3,086,000. 24/ Thus, inclusion of the medium-grade zone substantially lowers the ultimate return from mining the high-grade deposit under the Bureau of Mines' own analysis and it is difficult to see how Judge Irwin can cite this report in support of his position that a further hearing should be ordered.

Thus, for the foregoing reasons, I find myself in agreement with the lead opinion that the evidence fails to establish that appellants have made a discovery of a valuable mineral deposit on the GB-2 lode mining claim. 25/

24/ Assuming the mining of only the high-grade zone requires the utilization of a head grade of 1.251 oz/ton rather than 0.651 oz/ton figure used in Table 6. Total ore tonnage for the high-grade zone would be 16,932 rather than 25,168, which, given the rate of production indicated in Table 6, would be produced in slightly more than 10 years.

25/ I do wish to expressly disassociate myself from any inference which may be lurking in Judge Irwin's dissent that the failure of Administrative Law Judge Sweitzer to hold a prehearing conference in some manner contributed to the development of an inadequate record or lengthened the time spent in consideration of this appeal. First of all, as indicated above, I believe the record is more than adequate to make the determinations required herein. Secondly, it is hard to credit an argument that a 1-day prehearing conference would have obviated the need for an extended review by this Board.

The last issue which I wish to address relates to the question of the validity of appellants' millsite claims, the Golden Bear and the Lost Dutchman. Initially, I would note that, to extent that the GB-2 claim is invalidated, at least one of the millsites is also invalid as a matter of law, since the applicable statute, 30 U.S.C. § 42(a) (1988), permits only a single appropriation of additional land, not to exceed 5 acres, per min-ing claim. In any event, it is my view that the evidence fails to show compliance with the millsite law for either parcel, independent of the validity of the mining claims. In examining this matter, I will particularly center on the Lost Dutchman millsite, since the overwhelming majority of such evidence of use and occupancy as does exist relates to that millsite.

In analyzing the status of a dependent millsite it is important to focus on the exact nature of the statutory grant. Thus, in relevant part, 30 U.S.C. § 42(a) (1988) provides:

> Where nonmineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such nonadjacent surface ground may be embraced and included in an application for patent for such vein or lode, and the same may be patented therewith * * *; but no location * * * of such nonadjacent land shall exceed five acres. [Emphasis supplied.]

As we emphasized in United States v. Swanson, 93 IBLA 1, 93 I.D. 288 (1986), while actual development of a mining claim is not essential to its validity, that being dependent upon the existence of a discovery of a valuable mineral deposit, "[t]he essence of the millsite appropriation is use or occupancy" for mining or milling purposes, since actual use and occupancy is the sine qua non of the grant. Id. at 20, 93 I.D. at 299 (emphasis in original). In effect, the location of a millsite unaccompanied by actual use or occupancy of the land for mining or milling purposes is akin to the location of a mining claim unsupported by a discovery; the locator gains no rights as against the United States.

It seems beyond any dispute that, as of the date of the withdrawal of the land from entry (January 1, 1984), a date which preceded the patent application (May 24, 1984), the land embraced within the millsite claims was not being used or occupied for milling purposes. Judge Mullen's dissent seemingly attempts to obscure this undisputed fact by agreeing with E. J. Collord that "no prudent miner would build a mill without reasonable access to the mine." Infra at 329. It is, however, absolutely irrelevant whether or not a "prudent miner" would have built a mill without adequate access to the claims. The question is not whether appellants have an understandable reason for not complying with the law; the question is whether they have complied with the law. 26/ They clearly have not, at least insofar as milling activities are concerned. The mere intention to use a site

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26/ Judge Mullen's attempt to focus on what he perceives to be Forest Service obstructionism itself obscures the fact that appellants, by filing

in the future for milling purposes does not constitute compliance with the law. See, e.g., United States v. Skidmore, 10 IBLA 322 (1973); United States v. S.M.P. Mining Co., 67 I.D. 141, 143-44 (1960). Indeed, this principle was recognized in Lindley on Mines, 3d ed. at 1176, wherein that noted authority on mining law declared "[m]ere intention or purpose on a certain contingency of performing acts of use or occupation thereon will
not satisfy the law." If a prudent miner would not build his mill without adequate access to the mine, so, too, should he refrain from locating a millsite until access is secured.

The fact that appellants may "need" the millsite to develop their claim is equally irrelevant. Millsites may not be patented simply because a claimant asserts that he "needs" the land for the eventual construction of a mill which is itself necessary in order to mine his claim. See, e.g., United States v. Werry, 14 IBLA 242, 252 (1974). 27/ Only after such time as need ripens into actual use or occupancy has an entryman complied with the strictures of the law and, only at that time, has he acquired any rights to a patent of the millsite claim.

The only arguable question is whether it can be said that the land was being used or occupied for mining purposes. I think that the answer to that question must be in the negative.

Insofar as occupancy of the land for mining purposes is concerned, I think it clear from an analysis of the facts developed at the hearing that

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fn. 26 (continued)
a patent application, have affirmatively asserted that they have complied with the law, not that they would have complied with the law but for Forest Service actions. Moreover, much of the Forest Service's reluctance to authorize activities planned by appellants with which Judge Mullen takes umbrage could be seen as totally proper caution in dealing with actions involving a wilderness. Thus, even where only a wilderness study area is involved, this Board has noted that BLM can refuse to permit access which woud impair wilderness suitability to a mining claim until such time as the mining claimant affirmatively establishes the existence of a valid existing right, i.e., a discovery of a valuable mineral deposit. See, e.g., Southern Utah Wilderness Alliance, 125 IBLA 175, 188-89, 100 I.D. 15, 22-23 (1993); Richard C. Behnke, 122 IBLA 131, 140 n.13 (1992); Havlah Group, 60 IBLA 349, 361, 88 I.D. 1113, 1121 (1981). This Board, I believe, should be cautious in criticizing other agencies for actions which are arguably within the legitimate scope of their delegated responsibilities.

27/ In point of fact, far from establishing the qualification for a millsite, the question of "need" actually arises as a limitation on the grant. Thus, in United States v. Swanson, supra, even though the millsite claimant established that he had "occupied" a number of millsite claims within the meaning of 30 U.S.C. § 42(a) (1988), the Board examined the evidence to determine whether the claimant actually needed all of the claims, determining, in a number of cases, that certain millsites were excess to his needs. See United States v. Swanson, supra at 34-39; 93 I.D. at 307-09.

the claimants have simply not occupied the land in either millsite within the meaning of 30 U.S.C. § 42(a) (1988). Thus, it is clear that the cabin on the Lost Dutchman pre-existed their entry and was merely appropriated by appellants for their own use. It is true, of course, that appellants testified that they camped on the Lost Dutchman while locating the claims and performing sampling activities thereon and that the millsite was apparently
used as a base for performing assessment work. None of these activities,
I would suggest, is sufficient to show an occupancy of the land for mining purposes under the statute. 28/

The simple fact of the matter is that, since no mining was occurring on either of the mining claims, the millsites could not be used or occupied for mining activities. Thus, past decisions have consistently held that use of land in association with prospecting activities does not constitute use of the land for mining purposes. See, e.g., United States v. Wedertz, 71 I.D. 368 (1964). Nor, I would suggest, does the mere performance of assessment work constitute mining of the claim, unless it can be shown that the assessment work was performed in the course of actual development of the mining claims. Moreover, even assuming both that a discovery exists on an associated mining claim and that the claim is being actively worked, the use of a claimed millsite merely as a base for performing the work does not constitute compliance with the statutory requirement relating to use of the

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28/ I must record my disagreement with the lead opinion's assertion that "[t]he record indicates that claimants may have occupied the millsite
claims with a good faith intention to eventually use them for mining and milling purposes." Supra at 289. It seems to me that this statement confuses "occupancy" in some sort of generic sense with "occupancy" within
the meaning of 30 U.S.C. § 42(a) (1988). I will admit that appellants "occupied" the land embraced in the Lost Dutchman millsite in the same
sense that any overnight camper "occupied" the same land, but this is not the occupancy contemplated in the Congressional grant.

Congress preconditioned its grant on the present use or occupancy of the land for mining and milling purposes, not on the "future" use or occupancy of the land for mining and milling purposes nor on the "present" use or occupancy of the land for purposes other than "mining" and "milling." In this regard, the "intention" of appellants is irrelevant, save to the extent that proof of the existence of "bad faith" could nullify even qualifying use. See, e.g., United States v. Zimmers, 81 IBLA 41 (1984); In re Pacific Coast Molybdenum, supra at 35, 90 I.D. at 363.

Our decision in United States v. Swanson, supra, is indicative of this concern. A review of that case shows that the various millsites involved therein were the situs of extensive tailings ponds, numerous living structures constructed by appellants and other improvements which, in and of themselves, constituted an "occupancy" of the land for mining or milling purposes. Far from recognizing future intended occupancy of the land as qualifying under 30 U.S.C. § 42(a) (1988), the Swanson decision actually analyzed the claimant's intentions in order to determine whether the present occupancy disclosed by the record was in good faith for mining and milling purposes.

millsite for mining activities, unless the use, itself, can be deemed substantial. See United States v. Polk, A-30859 (Apr. 9, 1968) (sporadic and occasional use of a millsite as a base of operations on a valid mining claim held not to constitute use for mining and milling purposes under 30 U.S.C. § 42(a) (1988)).

The evidence in the instant case shows no indicia of substantiality with respect to the use or occupancy of the millsite by appellants, even assuming arguendo that their activities on the GB-1 and GB-2 claims could be classified as mining. On the contrary, the use of the land within the Lost Dutchman millsite alleged by appellants is essentially that they camped on the land, a use no different than that made by the Forest Service personnel when they sampled the claims or by numerous hunters, backpackers, and others who would find the flat ground of the millsite equally suited to their needs. In short, I fail to find any justification in the record for validating either of the two millsites.

I recognize that some of my colleagues might view the foregoing analysis of the millsite law as excessively restrictive, rejecting, as it does, any claims of anticipated use or future need as a basis for obtaining a patent to a millsite. But, not only has this always been the animating principle in Departmental adjudications, reflection shows that it must continue to be our present touchstone.

The mining law contains certain in-built protections against the misappropriation of lands via the location of mining claims. Thus, in order to obtain a patent, a mining claimant must show both that a discovery exists within the limits of the claim and that he has expended at least $500 in developing the claim (a not insubstantial amount in 1872 terms). Even then, of course, it was always possible that no mining would occur after issuance of patent, but it was supposed that simple economics would normally impel development after patent issuance. With regards to millsites, however, not only is there no requirement of a discovery, there are no required expenditures as a precondition for obtaining a patent, beyond those assumed to have been made in the course of developing the land for millsite purposes. Thus, actual occupation or use of the millsite for mining and milling purposes is the sole objective indiciaum of the ultimate likelihood that the land will be committed in the future to the purpose for which it is being patented.

To permit the patenting of land for millsite purposes based on mere assertions of future use or eventual need is, in essence, no different than patenting land for a mining claim based on a future discovery. If an individual wishes to obtain land for millsite purposes, he or she must, as a condition for receiving the grant, use or occupy the land as a present fact. If a millsite claimant is unable to make the requisite showing, he or she is no differently situated than the mining claimant who is engaged in searching for a valuable mineral deposit but who has yet to find it. Neither has complied with the law and neither has obtained the right to a patent. Subjective good faith cannot and does not substitute for objective compliance. The millsite claims herein are properly rejected.

In summary, I concur, for the reasons stated above, with the conclusions of the lead opinion reversing Judge Sweitzer's determination that the GB-1 lode mining claim was invalid but affirming his determinations that the GB-2 lode mining claim and the Golden Bear and Lost Dutchman millsites were invalid under applicable law.

James L. Burski
Administrative Judge

We concur:

Bruce R. Harris
Deputy Chief Admininstrative Judge

Gail M. Frazier
Administrative Judge

David L. Hughes
Admininstrative Judge

CHIEF ADMINISTRATIVE JUDGE BYRNES CONCURRING IN PART AND DISSENTING IN PART:

There is such a diversity of opinion among my colleagues' writings in this case that it presents a veritable buffet from which to choose. And while there is much to agree with, there is also much to disagree with. Fortunately, what we agree on is much more important than what we disagree on. While, as the length of my colleagues' opinions demonstrates, it is tempting to write at length on the subject, I believe that it would better serve the decisionmaking process to review the legal construct that we are working within, and draw conclusions from my view of the law and the record. 1/

We all agree that the Collords have claims that encompass a substantial amount of gold mineralization, particularly on the Golden Bear No. 1 (GB-1) claim. What we disagree on is whether there is enough gold on the second claim, Golden Bear No. 2 (GB-2), to justify mining it. Judges Arness and Burski have constructed enough information from the record to conclude that the GB-2 claim is not profitable; Judge Mullen finds it is profitable. Under any of the various mining methods chosen by my colleagues one thing is clear: there is a significant amount of gold mineralization on both the claims. The question is whether there is enough to meet the legal threshold for a valid mining claim.

The tests used to determine the answer to this question have been described as the "prudent man test" and the "marketability test." Under the prudent man test, the valuable mineral deposits must be of a quality and amount that "a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine * * *." Castle v. Womble, 19 L.D. 455, 457 (1894). The marketability test merely provides that it must be shown that the minerals to be mined can be sold at a price higher than the cost of extraction and transportation.

The Supreme Court has upheld the application of these tests to determine the validity of mining claims. The Court has also described their application:

> As we have pointed out above, the prudent man test and the marketability test are not distinct standards, but are complementary in that the latter is a refinement of the former. While it is

1/ While I write separately, I generally agree with the conclusions as to the depth, amount, and quality of the mineralization as set forth in Judge Mullen's opinion. Additionally, I have taken note of and agree with much of the Bureau of Mines (BOM) report on the Collords' claims. It is clearly appropriate to take note of this report pursuant to 43 CFR 4.24(b), since it is a public record of the Department. This report merely bolsters testimony from a BOM mining engineer, contained in the record, that the claims contain a valuable mineral deposit that meets the prudent man test (Tr. 363-85).

> true that the marketability test is usually the critical factor in cases involving nonmetallic minerals of widespread occurrence, this is accounted for by the perfectly natural reason that precious metals which are in small supply and for which there is a great demand, sell at a price so high as to leave little room for doubt that they can be extracted and marketed at a profit.

United States v. Coleman, 390 U.S. 599, 603 (1968).

Any claim must only meet the prudent man standard, i.e., have only a reasonable opportunity for a miner to extract the mineral at a profit. There is no requirement that a profit be guaranteed or even more likely than investing in the stock market.

> The reason for accepting less than demonstrated profitability as a condition to patentability is to encourage the investment of capital in the development of mineral resources. * * * No doubt it would further that purpose to offer the incentive of patentability to "prudent" prospectors as well as "prudent" mine developers. But there are other considerations. A patent passes ownership of public lands into private hands. So irrevocable a diminution of the public domain should be attended by substantial assurance there will be public gain in the form of an increased supply of available mineral resources. The requirement that actual discovery of a valuable mineral deposit be demonstrated gives weight to this consideration. [Emphasis added; footnote omitted.]

Barton v. Morton, 498 F.2d 288, 292 (9th Cir.), cert. denied, 419 U.S. 1021 (1974).

Additionally, it is clear from our precedents that the amount and manner of mining of particular ore bodies is left to the discretion of the miner. A miner may proceed to mine several claims in order to develop a single valuable mine if he shows a discovery of valuable mineral is located on each claim. See United States v. Harlan Foresyth, 100 IBLA 185, 249-50, 94 I.D. 453, 488-89 (1987).

We can now proceed into the area where, as Judge Burski points out, reasonable minds can differ.

In deciding this case we should apply these principles reasonably and not in such a way as to demand economic certainty of profitability. Just as the Collords have no guarantee of making any profit on this venture, neither does law or logic require that we be certain beyond cavil that this mining operation will, in fact, make any profit. To demand such certainty does not take into consideration the inherent uncertainty of the mining industry or, for that matter, any business. The majority's interpretation of the prudent man test as applied to the GB-2 claim seems to require an ironclad guarantee not only of a profit, but an assurance of profit better than the average return of the Dow Jones' top 100 companies.

In fact, evidence submitted shows that the GB-2 claim can be mined at a profit, as Judge Mullen well points out in his dissent. Judge Burski concedes that mining the GB-2 claim would result in a profit of $8,000 to $15,000, albeit under what he terms a "rosy outlook" (Burski, A.J., concurring at 311 n.23). What this does show, however, is that the majority focuses too much on the profit the Collords will make, when the courts have instructed that the fact of an actual profit need not be proven.

The "prudent man" is not a man who would not take any risk unless he is guaranteed an enormous profit, otherwise he should not be in the business of mining. In my view the "prudent man" as defined by the courts and this Board is one who would take reasonable risks once it is established that a valuable mineral deposit is located. There is clearly sufficient evidence to conclude that there is a reasonable likelihood that a paying mine might be developed on the GB-2 claim, particularly since the capital expenditures will have been made to mine the GB-1 claim. Whether this mine will, in fact, bring any profit to the Collards will have to await the mining itself. Mining by its nature is no more predictable than the stock market and we should not require the certainty of a municipal bond return before we patent. The "prudent man" can and will take reasonable economic risks.

This is simply not a case of a far fetched scheme to obtain land for purposes other than mining, as in Coleman, supra. Nor is it the equivalent to the search for "El Dorado." The Collords have claims that clearly have a significant amount of gold on them. If we follow the dictates of Coleman, they should be allowed to mine this precious metal ore body.

A comment is in order about what the concurring opinion describes as the "pro rata" versus the "carrier" method of cost allocation. It is logical to conclude that once the Collords have made the capital investment required to mine the GB-1 claim that they would then turn their attention to a claim which might also be profitable, though not as profitable as GB-1. The bottom line is that they will have by then made these capital expenditures. It would then be reasonable and prudent to mine the medium grade zone to see if it is as, more, or less profitable than the geologic inferences suggest. Since there would be a single mine, there is no authority to suggest that profitability should be spread "pro rata" over the claims. 2/

2/ Judge Burski's suggestion that the result may have been different in the case of United States v. Mannix, 50 IBLA 100 (1980), had its facts been similar to the case before us, must be rejected as completely unauthoritative since he assumes facts that were not in evidence in that case when it was adjudicated some 13 years ago. In any event, the logic of the Mannix decision was that certain capital costs were already expended on the claims and that they should not be charged to the ongoing and future development of the claims. This would seem to be similar, if not identical, to the fact that certain capital costs will be incurred by the Collords in mining the GB-1 claim so that they should not be charged to the additional profit that can be made from mining GB-2. As noted, the entire mining operation should be evaluated for a reasonable opportunity for profitability.

Indeed, our prior decisions have proceeded in a different manner:

> [I]t is apparent the practice of the Department has been to allow the consideration of a group of claims as a mining unit where the issue of profitability is at stake. Moreover, decisions where the Department restricted the rules of discovery to a showing of the profitability of each claim in a group as a potentially viable independent mine do not appear to exist. In most instances, decisions deal with the concept of developing a "mining operation" or "mine" from a series of contiguous or nearby claims, although specific information is not directly elaborated upon that point. [Citations omitted.]

Schlosser v. Pierce, 92 IBLA 109, 132, 93 I.D. 211, 224 (1986).

We have, previous to this decision, followed the dictates of the courts. Thus, we have stated that:

> While the proof of quantity and quality are often interrelated, a claimant must prove that a valuable mineral is actually present on each of the claims. Once mineral is demonstrated to be present, the proof of sufficient quality and quantity of mineral to warrant development can take into consideration the overall mining operation. There is little question that circumstances exist in which a group of mining claims containing low grade ore can support a mining operation, and thus demonstrate a discovery [as applied in the "discovery rule"] on each claim, even though taken individually the claims might not contain sufficient quantity of ore of sufficient quality to support discovery.

Cactus Mines, Ltd., 79 IBLA 20, 32-33 n.2 (1984).

The concurring opinion also states concern over the so-called "best case scenario." While I do not believe that there has been any conscious effort to adopt this method, there have been good jurisprudential reasons for using such a standard in hindsight. When cases involving questions of reserves are not close, as is often the case, using the "best case" harms no one. When cases are relatively close, as is the one at hand, using the best case avoids an incorrect ruling by making a small factual or computation error. To the degree that we may have used a "best case scenario" the effect has been to guarantee a correct result.

In the case at hand, reasonable assumptions and geologic projections placed into evidence show that the GB-2 claim can be reasonably expected to produce a profit. Also, I would submit that the profit it would produce is no more remote than investing in a fast food franchise.

As to the Golden Bear and Lost Dutchman millsites, Judge Mullen sets out adequate facts to conclude that the Collords did as much as they were permitted by the Forest Service in connection with their use of the sites for mining that logically fit in their plan to mine the claims. Judge Sweitzer specifically found that "access has been restricted and proposals

to construct a road to the claims have been rejected." I agree with Judge Burski that the Forest Service may have made decisions necessary to carry out its land management responsibilities and those decisions should not be held against it. However, neither should the Forest Service's legal position benefit from actions that clearly had, at best, a chilling effect on the Collords' use of the millsite claims.

Even with the conditions imposed by the Forest Service, the Collords marked the millsite claims, improved the structures thereon, and used the land for their mining activities. This is sufficient use of the land to establish a millsite claim. Valcalda v. Silver Peak Mines, 86 F. 90, 94-95 (9th Cir. 1898).

I believe that the majority has lost sight of the United States v. Coleman, supra, standard. I conclude that there is a sufficient body of ore on each claim such that a "prudent man" would expend his time and effort in mining these claims. I also conclude that a single profitable mine can be developed from these claims. Therefore, I concur with the majority's disposition as to the GB-1 claim, and dissent as to the disposition of GB-2, and the Lost Dutchman and Golden Bear millsites.

_____
James L. Byrnes
Chief Administrative Judge

ADMINISTRATIVE JUDGE MULLEN CONCURRING SEPARATELY, IN PART, AND DISSENTING, IN PART:

I begin my dissent by setting out a few undisputed facts never alluded to in Judge Arness' lead opinion or Judge Burski's concurrence. As will be seen, when those opinions are considered in light of these facts, many of the conclusions in those opinions are without foundation.

I.

Crucial Background Information
Omitted From the Lead Opinion

The Collord claims are in an isolated area which was open to location in September 1979, but made a part of a wilderness area on December 31, 1983. Any work to develop the claims had to be undertaken between late May and early October because of the primitive conditions of access roads and heavy snowfall. Only six operating seasons were available between September 1979, when the claims were located, and February 1987 when the contest was initiated. An examination of the Collords' efforts to gain Forest Service permission to develop their claims clearly demonstrates their exercise of reasonable diligence.

> Work in 1980: During the first open season the claimants initially went to the claims on horseback because the Forest Service would not give them a key to the locked gate blocking the road. Tr. 612. Later they traveled to the Golden Bear Millsite in a 1/2 ton pickup and camped in the cabin on the millsites. Tr. 677-678. Collord did assessment work on the lode claims and examined the Lost Dutchman Millsite for suitability for a location for a mill to process ore mined from the lode claims. Tr. 676-77. In July 1980, less than a year after the claims were located, Collord sent the Forest Service his first request for permission to build a road from the Lost Dutchman Millsite to the lode claims to permit access for equipment to drive a drift on the vein. Exh. 4.

No formal mining plan was submitted in 1980. It should be noted, however, that, although Collord did work on the claims in 1980, no assessment work is required in the first assessment work year, which ended August 31, 1980.

> Work in 1981: A consulting engineer, hired to do work on the claims, camped on the Lost Dutchman millsite when he did the
> work. Tr. 678. A number of additional samples were taken on the lode claims. Tr. 860. The Forest Service urged Collord to file for a patent. Tr. 679, 825, 860. Collord sought permission to construct a road for access to the claims for the second time
> on September 14. Exh. 7. On September 18, the Forest Service responded to Collord's requests, advising Collord that prior to building the road: 1) a mineral examination must be conducted; 2) the road must be flagged on the ground; and 3) an Environmental Analysis must be prepared. Exh. 8.

In 1981 Collord proposed building a road to provide access to his claims for the second time, but was unable to get permission to do so.

> Work in 1982: On January 19, the Forest Service received Collord's proposed operating plan for the 1982 season, the third operating season after the claims were located. In his plan, Collord advised the Forest Service that he had surveyed the proposed road. Exh. 9; Attachment to Exh. 41. Forest Service office work for the Environmental Assessment commenced that winter. Tr. 106. On May 5, the Forest Service asked for additional information which was furnished on May 10. Attachment to Exh. 41. Collord outlined development plans and noted that final mill design would depend on the nature of mineral encountered in the drift. ICL Exh. A. Collord made four or five trips to the claims. Tr. 690. Receiving no approval for the proposed plan of operations, Collord did assessment work with minimal disturbance not requiring an approved operating plan. Tr. 683. Collord posted a bond covering his use of the road to the millsites. Tr. 694. The claims were surveyed by a Government mineral surveyor, between August 22 and August 29. Forest Service employee Sykes did an on site examination of the claims in September. Tr. 109, 113, 433, 453. At the time of Sykes' examination he noted that the road to the millsites was falling into disrepair. Tr. 453. After his examination Sykes expressed an opinion that building the road was the next logical step in the development of claims. Exh. 16. On December 23, 1982, Collord wrote a letter to the Forest Service, noting that he was unable to commence building the road in 1982 because the 1982 mining plan had never been approved and asking whether he should file a new operating plan for 1983. ICL Exh. E.

Collord's mining plan to build a road to his claims from the millsites was filed in January but the Forest Service never approved or denied his plan.

> Work in 1983: In May 1983 the Forest Service rejected Collord's operating plan which had been filed in January, 1982, advising Collord that it would not approve road construction. Collord was advised that he might be able to use a helicopter to drill (not in the mine plan) or build a foot trail to the claims (not in the plan). Collord initially agreed to build a trail less than four feet wide, in compliance with the limitation imposed by the Forest Service. ICL Exh. B. After examining a similar trail built by another operator (at the insistence of the Forest Service) and determining that equipment to drive a drift could not be transported on a trail as narrow as that imposed by the Forest Service, Collord elected not to build a trail. Tr. 698-705; 800- 804. The mineral survey field notes were filed with Bureau of Land Management (BLM) on July 6. M S 3654 A & B. On December 31, 1983 the land was withdrawn from mineral entry and made a part of a wilderness area.

Collord asked for a road to provide access for developing his claims. The Forest Service demands that he build a narrow trail which would not provide access for the equipment necessary to drive a drift.

Work in 1984: On January 3, Collord submitted another mining plan, proposing the construction of a road from the millsites to the lode claims. On the 11th of January the Forest Service stated that it would review its earlier decision regarding construction of a trail and asked Collord to submit additional information. On the 25th of January, Collord submitted a plan for diamond drilling and again asked for permission to build a road. On the 22nd of February the Forest Service requested more information. Collord responded by filing an "Exploration Plan" on April 20, and Forest Service acknowledged receipt on May 4. Collord applied for a patent to the claims on May 24, and the application was assigned serial number I-20886. On July 24, Collord was advised that a mineral examination must be undertaken before any mining plan could be approved, and that motor vehicle access from the wilderness boundary to the millsites was no longer allowed. Exh. 33. After January 1, 1983, everything transported to the claims was transported by horseback. Tr. 715. On September 5, Forest Service employee Curtis wrote a report finding valid existing rights, based upon a valid discovery of mineral in place on the lode claims. Exh. 35. On September 27, the Forest Service sought additional information from Collord regarding reclamation and environmental protection. Exh. 110.

Collord's 1984 mining plan was never approved or denied.

Work in 1985: On January 14, the Forest Service prepared an internal memorandum questioning the adequacy of the Sykes, Curtis, and Wallace examinations. Exh. 39; Tr. 99. On January 23, Collord submitted a mining plan for 1985, seeking to build a road from the millsites to the lode claims. Exh. 43, Tr. 81. Collord proposed drilling or driving a crosscut to the vein. Tr. 70. In response the Forest Service advised Collord that another Forest Service mineral examination to prove valid existing rights was necessary before any mining plan could be approved. Tr. 81. The week of June 17th, Forest Service geologist Thurmond did a field examination accompanied by Wallace, Bryan and Teague. Collord's geologists Hubbard and Smith were also present. Tr. 122. Forest Service employee Strata did a field study for road placement in October. Tr. 16. No valid existing right determination was made and Collord's mining plan was not approved or denied.

Collord's 1985 mining plan is neither approved nor rejected in 1985.

Work in 1986: The 5th draft of Thurmond's mineral report was prepared in February. Exh. 73. Thurmond's mineral report finding the claims invalid was signed by her on the 26th of February. Exh 73A. Mining consultant Kemp examined the claims for Collord in August. Tr. 998. Thurmond's report was approved by the Forest Service technical review board on June 11. Exh. 73A. Thurmond
and Teague examined the claims again on September 3. Tr. 131. Thurmond examined the millsites again on September 3. Tr. 133. The finalized Thurmond mineral report was signed by her on October 28 and approved on November 11. Exh. G.

No mining plan was approved and no permission was given to build a road. In February 1987, a mining claim contest complaint was issued.

II.

The Golden Bear No. 1 Claim Is Valid

The lead opinion found the Golden Bear No. 1 lode mining claim valid. I agree with that conclusion, even though the analysis supporting the lead opinion contains many material flaws. 1/

III.

The Millsites Are Not Invalid

The lead opinion concludes that "a preponderance of the evidence demonstrates that the Lost Dutchman and Golden Bear millsite claims were not being used or occupied for mining or milling purposes in connection with a valid claim" (Lead Opinion at 292 (emphasis added)). Both millsite claims were being used and occupied to the full extent allowed by the Forest Service. This unfounded and unsupported conclusion is the most glaring error in the lead opinion. The logic applied to reach that conclusion does not stand up in light of the facts (outlined above) and ignores the mining plan used in the lead opinion as the basis for finding the Golden Bear No. 1 claim is valid.

The lead opinion expressly acknowledges that:

> [C]laimants have occupied the millsite claims with good faith intention to eventually use them for mining and milling operations. They kept tools and building materials on the claims
> with the stated intention of improving the cabins so that they could house the men who would build a road and work on the mining claims and build a mill on the Lost Dutchman millsite claim.

This statement was made following the finding that the Golden Bear No. 1 claim was valid. The lead opinion found that ore could be mined from the Golden Bear No. 1 claim at a profit using a mining plan which included milling the Golden Bear ore in a mill constructed on the Lost Dutchman millsite. Following this conclusion the lead opinion found the millsite invalid because "the Lost Dutchman and Golden Bear millsite claims were
not being used or occupied for mining or millsite purposes in connection with a valid mining claim" (Lead Opinion at 292). **Since locating the claims Collord has never been permitted to develop access to his lode claims sufficient to drive a drift on the vein or move the ore from those claims to the millsite.**

Totally ignoring the history of Collord's inability to get action on a mining plan, the lead opinion found Collord's failure to "improve the cabin

1/ The concurrence also finds the claim valid, with no analysis or explanation of where or how the ores from the claim are to be processed.

and commence construction of a mill" prior to withdrawal to be a fatal omission, rendering both millsites invalid (Lead Opinion at 291). Collord submitted four mining plans between 1980 and the first time the Forest Service formally issued a decision rejecting a plan in May 1983. The lead opinion's conclusion suggests that the Forest Service would have automatically granted permission to make major improvements on a cabin or construct a mill complex. This assumption is totally unsupported by the facts. Collord was required to gain approval of a mining plan of operations before improving the cabin or building a mill, and it is patently obvious that the Forest Service never intended to allow any meaningful development.

I agree with the concurring opinion that a vague intent to eventually use the millsite is not sufficient to support a millsite location. Three things are required: a bona fide intent to prosecute the work and use the tract for mining and milling purposes, occupancy, and tangible evidence of the intent to use the millsite for mining or milling purpose. United States v. Rand, A-030036 (1964). In United States v. Wedertz, 71 I.D. 368 (1964), claims were found invalid because the claimant had not used the claims for development, and did not have adequate financial means to undertake the necessary development. Wedertz had failed to implement his mining plan.

It is not necessary to have the mill in place, or even started, however. A prudent miner cannot be expected to undertake the planning and construction of a modern milling facility, which is a substantial investment, when there is a substantial risk that he may be ousted from the millsite at any time before that mill is completed. Reason dictates a rational ad hoc approach to the question of the degree of undertaking necessary to support a millsite location. 2/ Collord's good faith intent, and his occupancy and development of the claim to the full extent that the Forest Service would allow are not in question. The tangible proof of his diligent prosecution of his mining plan is found in the record of his attempts to go forward with development. The lack of construction is the direct result of obstructive inaction on the part of the permitting agency now seeking to have the claim invalidated because of a lack of construction.

For the moment, let us assume the absurd. Assume Collord could gain Forest Service approval of a plan of operations calling for mill construction. When should Collord have started that construction? The lead opinion admits that it was impractical to do so after 1983. Collord would have been required to transport tons of mill equipment to the claims by horseback. Before 1983 Collord was unable to get any plan of operations approved or rejected. Thus, if his first plan of operations were to have included the construction of a mill or major improvements on a cabin, he could not have started that activity before 1983, because no plan of operations was ever approved before that date. The lead opinion was quick to find it reasonable for Collord to tie up capital in a mill complex because (quoting

2/ The author of the concurring opinion is absolutely correct when he observed that his analysis of the millsite law may be found to be excessively restrictive. It is.

the lead opinion) "road access to the minesite would eventually be approved, inasmuch as reasonable access is guaranteed to the owner of a valid mining claim" (Lead Opinion at 291 (emphasis added)). At the same time
that its employees were writing internal memoranda expressing opinions
that the claims were valid and that the road was the next logical step in development, the Forest Service was telling Collord that the only access
to his claims the Forest Service would allow was a trail less than 4 feet wide. 3/

Both the law (which is cited liberally in the lead and concurring opinions) and the facts (which are conveniently omitted) support a finding that Collord had occupied the millsites in good faith for mining and milling purposes. It is obvious from the evidence and testimony that the Forest Service accurately concluded that there are no mining and milling improvements on the Golden Bear and Lost Dutchman millsites. However, Collord
has used the millsites in connection with work on the claims. Both E. J. Collord and his father camped at the sites while performing their sampling activities (Tr. 1046). The elder Collord hauled timber, tools, and other materials to the Lost Dutchman millsite to upgrade the cabin, and his employee stayed in the cabin when he did the assessment work (Tr. 676-78). E. J. Collord testified that the only reason there was no mill on the millsite was that the Forest Service refused to allow Collord to build a road from the millsites to the lode claims (Tr. 1046-47). E. J. Collord correctly noted that no prudent miner would build a mill without reasonable access to the mine (Tr. 1046-47). The millsites are reasonably associated with a mining claim, and to the full extent that he was permitted to do so by the Forest Service, Collord demonstrated occupancy of the millsites for mining and milling purposes in connection with the lode claims. United States v. Shiny Rock Mining Corp., 112 IBLA 326, 360 (1990). The claims were located for use as a site for housing men and equipment in an isolated area and as a site for a mill to process ores from the lode claims. In the orderly development of the mine complex, Collord has advanced the development on the millsites and mill design to the fullest extent allowed by law, as that law was being administered by local Forest Service personnel.

The lead opinion and the concurring opinion send a clear message to
the Forest Service. By delaying and hindering mine development reasonably necessary to complete the design of a feasible and efficient milling facility, and thus delaying the construction of the mill, an otherwise valid millsite can be rendered invalid, even though the millsite was used in the lead opinion as the site of milling operations supporting the finding that
a lode claim was valid. 4/

3/ The concurrence suggests that the millsite should not be located until the road from the mine to the millsite is constructed. Would a prudent miner build this mill road without some assurance that he would have the land for a mill at the end of it?

4/ The concurring opinion concludes that the millsite should not be used in the feasibility analysis, but gives no independent basis for the conclusion that the Golden Bear No. 1 claim can be mined at a profit.

IV.

The Golden Bear No. 2 Claim Is Valid

A. Terms Used in this Opinion

A systematic evaluation of the character, amount, and quality of the mineral in place, based upon known geologic evidence, must be undertaken when determining whether a discovery exists. See United States v. Feezor, 74 IBLA 56, 85, 90 I.D. 262, 278 (1983). The examiner is not blessed with an ability to see into the bowels of the earth and cannot predict with absolute certainty any further than the depth that he or she can see into the rock. In spite of this obvious limitation, the examiner must observe the nature of exposed rock surfaces and estimate both the quality and quantity of mineral in place. To cast the prediction in a believable manner, the ethical trained examiner will explain the reliability of the estimates by using qualifying words and phrases. The use of these qualifying words is sometimes called "classification" of the deposit.

There is no firmly established or codified set of definitions of terms to be applied when classifying a mineral deposit. For example, a loose reference to any rock containing some valuable mineral as "ore" is sometimes used, but the stricter definition of "ore" as rock containing mineral that can be extracted and sold at a profit is almost always applied by those familiar with the minerals industry. 5/

I have found definitions developed by the Society for Mining, Metallurgy and Exploration and published in A Guide for Reporting Exploration Information, Resources, and Reserves, 43 Mining Engineering 379 (1991), to be both definitive and helpful to the analysis of a mineral deposit. See Vanderbilt Gold Corp., 126 IBLA 72 (1993). The use of these definitions results in a systematic analysis and discussion, and I will employ them in this opinion.

When making a mineral resource determination the primary factors considered are the physical characteristics of the deposit. The terms "measured," "indicated," and "inferred" are appropriate when discussing the existence of a concentration of naturally occurring mineral material, with the location, grade, quality, and quantity known or estimated from specific geologic evidence. When an "inferred" mineral resource block has been delineated, it can be further examined to determine if a portion or portions of that block should be classified as "indicated" or "measured," based upon the type and reliability of the evidence available. The terms "measured, indicated, and inferred" are applicable only in the context of a discussion of mineral resources and are not used when describing a mineral "reserves."

5/ Compare Hugh E. McKinstry, Mining Geology at 649 (1948) and footnote 1 of the lead opinion.

In the normal development of a mine the sampling program may be so complete on one section of a vein that the sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well defined that the size, shape, depth, and mineral content of the resource are well established. This section of the vein (whether measured horizontally or vertically) could be described as "measured." Another section of the same vein may have sites for inspection, sampling, and measurement spaced farther apart or otherwise less adequately spaced. For that section of the same vein the degree of assurance, although lower than that for a measured resource, could be high enough to assume geological continuity between points of observation. The resources on that section of the vein can be designated as "indicated." It is also possible that the vein could have sections with resource estimates based on geological evidence and assumed continuity and for which there is less confidence than for measured and indicated resources. Nonetheless, those sections of the vein could be resources if the estimates are supported by reasonable geo-scientific (geological, geochemical, geophysical, or other) data. Those resources would be classified as "inferred."

After the "measured" and "indicated" blocks have been identified, those blocks can be further examined to determine whether they, or any part or parts of them, warrant being identified as reserves. The terms used to classify a reserve are directly related to the underlying classification of the mineral resource but are applicable only after a detailed economic analysis of the present viability of the deposit.

B. Geology of the Golden Bear Deposit

1. Area Geology

Thurmond stated that the principal rock types in the area were quartz monzonite and related intrusive of the Idaho Batholith (Exh. G at 8). The major regional structural trend noted by her was pre- and post-deposition northward treading shear zones (Exh. G at 9). She identified the host rock on the claims as fine grained diorite with some propylitic alteration (Exh. G at 9).

Kemp noted that the host rock on both sides of the mineralized structure for its full length consisted of dioritic to monzonitic rock (Exh. 59 at 3; Tr. 883). Kemp described the diorite as "a hard dense material composed of, in this case, of interlocking mineralization which allows this rock when it breaks" to break clean and "allow[s] the propagation of [open] space fracture as opposed to shear zones, predominantly because the rock contains no mineralogies [sic mineraloids] or alteration" (Tr. 883). 6/ Kemp expected little material change in the wall rock competency with depth (Tr. 884). He noted little alteration and stated that the contact between the vein and the wall rock was sharp (Exh. 59 at 3).

6/ I believe this to be a reporter's error.

2. Golden Bear Vein

The Golden Bear vein structure contains the valuable mineral in place on the Golden Bear claims. Thurmond testified that it is a well-defined quartz vein striking N. 67-76° W. and dipping 54-85° NE (Exh. G at 9).
She stated that the "vein varies in width from four inches to five feet
and averages about 2.0 feet on the [Golden Bear] No. 1 claim and 1.5 feet
on the [Golden Bear] No. 2 claim" (Exh. G at 9). The other witnesses were in general agreement with this description. See Exh. 59 at 3; Exh. 49 at 2.

As mentioned in the lead opinion, there was material disagreement regarding how the vein material should be described. Based on a general statement in P. J. Shenon and C. P. Ross' "Geology and Ore Deposits Near Edwardsburg and Thunder Mountain, Idaho," Idaho Bureau of Mines and Geology Pamphlet 45 (1936) (Shenon & Ross), Thurmond expressed the opinion that the vein was sheared, chloritized, faulted, and gouged (Exh. G at 9). Relying on a description of the Golden Bear vein in F. W. Cater, et al., "Mineral Resources of the Idaho Primitive Area and Vicinity, Idaho," (GS Bulletin 1304 (1973) (Bulletin 1304)), she also described the vein as a "pinch and swell quartz vein structure" (Tr. 233, 239; Exh. G at 9, Exh. 73A). When asked to identify those portions of the Golden Bear vein showing shearing
on cross-examination, Thurmond referred to her field notes (Tr. 169-70). Her field notes (Exh. 107) make no reference to vein gouge, or chloritization, and the only reference to vein shearing was made in the description
of sample site A, at the easterly end of the vein.

Kemp testified that a "pinch-and-swell vein is predominantly found within a metamorphic terrain," characterized by a shrinking and swelling of the quartz into boudins, within the shear. He noted that pinch-and-swell implies a shearing phenomenon with the vein being "sheared and pinched down to zero" (Tr. 990-91). E. J. Collord testified that the vein was a fissure vein and that he saw "very little evidence of * * * shearing on the Golden Bear" and no "evidence at all of anything [he] would call a shear zone" (Tr. 1043). He did not see "any shearing in the wall rock adjacent to
the vein" (Tr. 1043) and saw little evidence in the exposures of faulting (Tr. 1041). He also testified that the vein appears to have through-going characteristics that are certainly consistent in one exposure to the other that do not suggest pinch-and-swell (Tr. 1042). Hubbard testified that the vein is not sheared and that he observed no faulting along the margins of the vein (Tr. 729). He also stated that neither the vein nor the wall rock was fractured (Tr. 733).

Kemp and Hubbard described similarities between the Golden Bear and
the Snowshoe veins (Tr. 744, 920-24). The Snowshoe mine lies approximately 3.7 miles northeast of the Golden Bear claims (Tr. 920; Exh. G at 7, Exh. 73 at 9). The Snowshoe vein which displays similar mineralization, strike lengths, and physical orientation (Tr. 923), was successfully mined to a depth of 500 feet (Tr. 744, 921-24). 7/ Kemp related that reports on the

7/ Based on existing mine maps and all other descriptions the vein was in ore when the mine was shut down by War Production Board Order L-208 (cited as Exec. Order No. L-2048 (Oct. 8, 1942), at Tr. 923-24).

Snowshoe mine describe the Snowshoe vein as having a strike of approximately north 50° west and a dip of approximately 60° to the northeast (Tr. 921). The Snowshoe vein had an exposed strike length of about 575 feet, a projected strike length of 2,000 feet, and a vein width of
from 0.5 to 4-1/2 feet (Tr. 921-22). The mineralization in the Snowshoe vein ranged from a trace to 4 plus ounces per ton (Tr. 922). Vein faulting was minor, and Kemp states "the Snowshoe vein is cut by northeast treading faults, but the offset, as far as I'm aware maximum offset was six feet,
and the vein, underground workings of the vein is continuous" (Tr. 923).
At the time of the hearing Thurmond had not examined the Bureau of Mines files on the Snowshoe (Tr. 1223).

Thurmond's conclusion that the Golden Bear vein is a pinch and swell vein because it fits the Shenon & Ross description of "most" of the mineral deposits on Ramsey Ridge is substantially refuted by her field notes and
the testimony of Collord's experts. The article she relied upon may well generally describe veins in the general vicinity of the claims, but on-site observations of the vein by several experts, including Thurmond, simply did not support the conclusion that this vein was sheared, chloritized, faulted, and gouged, and with marked local variation in attitudes of quartz lenses (veins) and sheared zones. 8/ In turn, the Forest Service elicited no testimony that would discredit or refute the observations or conclusions of Collord's experts that the vein was a fissure vein.

C. Resource Estimates

All mineral resources have three dimensions, and when making mineral resource estimates it is necessary to visualize the deposit in all three dimensions. A second quality universal to all mineral deposits is the inability to visually penetrate rock. As a result, one attempting to estimate the size and value of a mineral deposit is never absolutely sure that what is observed at any exposure will persist. Thus, all mineral resource estimates are based upon an informed assumption that what is observed on the surface will continue for a determined distance into the rock -- a "projection." Even in the cases when an ore body is "blocked out on all sides," a statement of the size and quality of that ore body is no more than an estimate -- the exposed mineral could be no more than a few microns thick on all surfaces. The old adage stated again and again by those making estimates of the size and quality of mineral deposits is that one is never sure until the ore body is mined out.

8/ An implication of the pinch-and-swell phenomenon is the inability to assume a constant vein width. However, Collord and Forest Service experts agreed that the vein, as exposed on the Golden Bear No. 1 claim has an average vein width of 2 feet. Use of average vein width takes into account pinch-and-swell characteristics if sufficient data are collected. Kemp
does not distinguish between the width of the vein on Golden Bear No. 1 and Golden Bear No. 2 claims. The Forest Service places the average vein width on Golden Bear No. 2 claim at 1.5 feet, based upon an unsupported conclusion that the vein on that claim is not the same vein as that found on the Golden Bear No. 1 claim.

In this case one of the three dimensions, the strike, or horizontal dimension of the various segments of the Golden Bear vein, is readily measurable and observable along the vein's apex. The width of the vein can also be determined by direct observation, but the vein varies in this dimension along its course. The third dimension, the vertical dimension, is more difficult to picture in one's mind. A determination of what would be a reasonable projection for the mineral deposit on the Golden Bear claims must be made, based upon what is known about that structure on the horizontal plane and then on the vertical plane.

1. Inferred Resource Calculation

a. Horizontal Extent of the Golden Bear Vein Structure

All of the witnesses and Judge Sweitzer found the Golden Bear vein to be either exposed or reasonably projected on the claims for a total distance of approximately 1,200 feet. See Decision at 10; Tr. 935. The lead opinion states that the length of the vein is "fairly well established at 1,287 feet" (Lead Opinion at 269). There is no difficulty finding an "inferred resource" on the claims averaging 2 feet in width extending 1,200 to 1,300 feet in length. 9/

b. Vertical Extent of the Golden Bear Vein Structure

Judge Sweitzer found: "Geologic evidence sufficient to support the inference of continuity of values and the extent of the vein at depth is lacking. Contestees' projections of ore reserves are therefore inherently unreliable and cannot serve as evidence of a discovery." (Decision at 23-24 (emphasis in original)). In doing so he overlooked uncontroverted evidence supporting vertical continuity of the structure and improperly limited the use of reasonable geological projection. 10/

Undisputed evidence supports the finding that there is vertical continuity of the Golden Bear vein to the depth significant to this decision. When examining a map of the outcrop of a vein the map appears to give information only on the horizontal plane. However, if the map contains elevation contours or some other means of identifying changes in elevation it also contains evidence of vertical continuity of the vein. If the vein outcrops on a hillside there is evidence of both horizontal and vertical continuity.

The long sections on Exhibits 88 and 93 indicate that sample site A lies at an elevation approximately 175 feet higher than sample site P (as

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9/ This distance is on the horizontal plain and is not the length of the outcrop. This fact should become apparent when the exposure of the vein on the vertical plane is addressed.

10/ There is an unfortunate similarity between the "inference" that the mineral will continue at depth and the term "inferred mineral resource."
A reasonable "inference" of continuity can be made when calculating proven reserves, but there can be no proven reserve calculation for an inferred mineral resource.

identified in Appendix I). This elevation differential and lack of faulting or other known structural interruptions gives firm support to a projection of the vein structure to the elevation of the lowest exposure.

This observation is confirmed by testimony regarding drifting on the vein from a surface portal (Tr. 139, 309, 408, 436, 447, 651, 740, 889, 1073, 1096, and 1198). If the vein is exposed at the portal, all mine operations at a higher elevation lie above the lowest vertical exposure of the vein. The continuity of the vein with the change in elevation supports a vertical projection of the vein structure to the lowest exposed elevation. The lead opinion notes this when it states that the vein is exposed from a point from 400 to 1,400 feet above the Lost Dutchman Millsite. 11/

If the exposure of the vein at the outcrop had no vertical expression, other evidence would support a vertical projection of the vein structure for a reasonable distance. In United States v. Feezor, supra at 72-73, 90 I.D. at 270-71, we rejected an implication in prior decisions that no recourse to geological projection could be made until a discovery of a valuable mineral deposit is shown to exist. In United States v. Larsen, 9 IBLA 247 (1973), aff'd, Larsen v. Morton, Civ. No. 73-119 TUC-JAW (D. Ariz. Oct. 24, 1974), we stated:

> While geological inference may not be relied upon to establish the existence of a mineral deposit, it may be accepted as evidence of the extent of the deposit. That is, where ore had been found, the opinions of experts, based upon knowledge of the geology of the area, the successful development of similar deposits on adjacent mining claims, deductions from established facts--in short, all of the factors which the Department has refused to accept singly or in combination as constituting the equivalent of a discovery--may properly be considered in determining whether ore of the quality found, or of any minable quality, exists in sufficient quantity to justify a prudent man in the expenditure of his means with a reasonable anticipation of developing a valuable mine. [Emphasis supplied.]

United States v. Larsen, supra at 262; cited in United States v. Feezor, supra at 72-73, 90 I.D. at 271. In Feezor, we explained the source of the conflict resulting from dicta found in prior cases, stating:

> The source of this conflict can be discerned from a review of the early Departmental and judicial pronouncements on this question. United States v. Henault Mining Co., 73 I.D. 184 (1966), involved a contest initiated under section 5 of the Surface Resources Act, Act of July 23, 1955, 69 Stat. 369, 30 U.S.C. § 613 (1976). The mineral claimant in that case had

11/ Based on this statement one could conclude that there is 1,000 feet of vertical vein exposure.

alleged that high mineral values in the area were consistently found in the Homestake formation. Though the claimant believed that the formation dipped beneath his property, the Homestake formation had not been exposed thereon. Appellant suggested, however, that a number of tertiary dikes which did outcrop on the claims had originated beneath the Homestake formation and thus it could be geologically inferred that the Homestake formation underlay the claims.

In its decision rejecting this contention, the Department expressly noted that there was no contention "that the Tertiary dikes or intrusions carry valuable mineral deposits." 73 I.D. at 193. Responding to an argument that the claimant had met the threefold test established in Jefferson-Montana Copper Mines Co., 41 L.D. 320 (1912), for establishing a discovery on a lode claim, the Assistant Solicitor adverted to the language immediately following the test, that, among the many factors relevant to the prudent man determination were "[t]he size of the vein, as far as disclosed, the quality and quantity of mineral it carries, * * * the geological conditions, the fact that similar veins in the particular locality have been explored with success, and other like facts." 41 L.D. at 323-24.

> This language clearly refers only to the vein or lode which has been discovered and "disclosed" and sets forth the factors for determining whether that vein or lode contains mineral values worth exploiting. In the case here, the only veins or lodes which have been exposed on the claims are the Tertiary dikes or intrusions which are not claimed to be [a] source of valuable mineralization. The discovery upon which the appellant relies is of the Homestake formation which has not been exposed on the claims.

73 I.D. at 195. Thus, the Henault case merely reaffirmed the traditional view of the Department that an exposure of the vein or lode allegedly carrying the mineral values is a necessary precondition to the validity of a lode claim, and that geologic inference could not be substituted for such an exposure. See, e.g., East Tintic Consolidated Mining Claim, 40 L.D. 271 (1911), on rehearing, 41 L.D. 255 (1912). The Department's decision was affirmed in Henault Mining Co. v. Tysk, [419 F.2d 766 (9th Cir. 1969]. [Emphasis in original.]

United States v. Feezor, 74 IBLA at 73-74, 90 I.D. at 271-72.

The expert witnesses appearing for the Forest Service and Collord all projected the vein to a depth equal to one-half the strike length (Exhs. G, 66A, and 73A). They testified that it was a commonly accepted practice employed by industry to project one-half of the strike length when calculating the extent of resources and reserves (FS Tr. 142-43, 314, 742, and

936). However, there must be a factual foundation for applying this "rule of thumb," and it must be shown that a projection of one-half of the strike length is reasonable.

On appeal the Forest Service urges the rejection of the use of this "rule of thumb," arguing that it is not likely that values will exist at depth. In support of its argument the Forest Service relies on the description of the vein as a pinch and swell vein in two reports; Cater (1973 at 156) and Shenon & Ross (1936 at 31). 12/ However, as noted previously, the Forest Service's witnesses' testimony and the description of the vein set out in the field notes do not support applying this general description to the Golden Bear vein. 13/ On the other hand, the evidence presented by Collord's witnesses both explained the apparent discrepancy between the field observations and the prior reports and laid a foundation for projecting the mineralization for a distance equal to one-half the strike length.

Other evidence supports a reasonable expectation that the vein will continue on its downward course for a distance equal to one-half of the strike length. By way of an example, the evidence and testimony presented by Kemp is consistent with the requirements set out in Feezor. His testimony about other geologic evidence on the Golden Bear claims supported a projection of continuity at depth. See Tr. 882-83, 889-91, 919-24; see also the discussion of similarities between the Golden Bear and the Snowshoe Mine above.

On appeal the Forest Service stresses the absence of core drilling data and assays of samples taken at depth. However, the Forest Service has not shown that "the inference to be drawn from the absence of these tests negates the positive testimony [offered by Collord] to show continuity [at depth] or renders [Collord's] testimony so insubstantial that it cannot be given any weight in determining which evidence preponderates." Kaycee Bentonite Corp., 64 IBLA 183, 229, 89 I.D. 262 (1982), cited and quoted in Kaycee Bentonite Corp., 79 IBLA 182, 194, 91 I.D. 139, 145 (1984). 14/

12/ The reports and pinch-and-swell veins were discussed in some detail above.

13/ On the stand Thurmond stated that projecting the mineralized zones to one-half their strike lengths was nothing more than speculation (Tr. 142-43; see also Tr. 1230). She based her opinion on a statement in the Shenon & Ross Pamphlet 45 that the marked local variation in attitudes of quartz lenses (veins) and sheared zones indicate that most of the mineralized zones in that area were not persistent.

14/ "Inference" is an operative word in the Forest Service argument. A showing that the claimant was unable to readily obtain access for drilling or drifting to test the vein at depth should limit any inference that might otherwise be drawn from a "failure" to test the vein at depth. As set out at length above, there is a very obvious reason for the Collords' failure to test the vein at depth.

c. Conclusion

Based upon the evidence, the vein structure classifiable as an inferred resource can reasonably be expected to exist for a horizontal distance of not less than 1,200 feet and a vertical distance of not less than 600 feet.

2. Portions of the Vein Identified as an Inferred Resource are Classifiable as an Indicated Resource

a. Horizontal Extent of the Golden Bear Vein Structure Classifiable as Indicated

All parties acknowledged two major exposed vein outcrops separated by an unnamed scree-filled drainage located between sample sites K and M (Exh. 92). Kemp traced the westerly portion of the outcrop for about 460 feet and traced the easterly portion for approximately 200 feet (Exh. 59 at 3). Thurmond found a 464-foot exposed strike length on the westerly portion and 207 feet on the easterly portion (Exh. G at 9). She also expressed the opinion that the vein continued under the scree overburden, rather than being truncated (Exh. G at 9). As can be seen, the physical measurement of the strike length of the exposed portions of the vein was relatively close. The exposed portions of the vein had been sampled and measured in the exposed portions with sufficient regularity to justify classifying those portions of the vein as indicated mineral resource. However, without further evidence, the mineral resource in that portion of the vein covered by scree does not warrant a higher classification than "inferred."

b. Vertical Extent of the Golden Bear Vein Structure Classifiable as Indicated

It is clearly permissible to classify an indicated resource partially upon a projection, so long as the projection is for a reasonable distance and is based on geologic evidence. This is true even though the sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to permit the mineral bodies to be outlined completely or the grade established throughout. The Golden Bear vein can reasonably be projected on the vertical plane for a distance equal to one-half of the horizontal distance. Thus, a vertical projection of the two indicated mineral resource blocks can be made for a distance of 230 feet and 100 feet, respectively.

3. Sampling and Assays

A crucial factor in any discovery determination is the quality of the contained mineral -- how rich is the deposit. For metalliferous deposits such as gold, this is almost always determined by collecting and assaying representative samples of the exposed mineralization. Considering the fact that the concentration of gold in samples is often erratic, the assay results in this case are surprisingly close, supporting the conclusion that they are reliable.

In 1981, E. J. Collord took 17 samples from the Golden Bear vein (Tr. 1029). "[S]ample size range from five to seven pounds, they were chip samples taken at right angles to the veins [an] attempt [was] made to sample ore or wall rock on at least both hanging, foot wall" (Tr. 1031). The samples were fire assayed (Tr. 1031-32), and the assay results were made a part of the record (Exh. 6). The assay values, which ranged from 0.004 to 2.09 ounces of gold per ton (oz Au/ton) (Tr. 1032; Exh. 6), are identified as "COLLORD" samples in Appendix I, found at the end of this opinion.

In June 1985 Thurmond and Hubbard each took 12 samples at E. J. Collord's sample sites, finding those sites representative of the vein material. The Hubbard Report relates that "[a]ll samples taken by the Forest Service were channel samples oriented normal to strike and dip of the vein" (Exh. 49 at 3). Thurmond's samples, identified as GB1-1 through GB1-6 and GB2-1 through GB2-7 (Appendix B to Exh. G), were fire assayed and the assay report indicated values ranging from a trace to 1.595 oz Au/ton (Appendix B to Exh. 9).

A map (Exh. 97) depicts the sample sites. Sample points are spaced approximately 50 feet apart, with two sample points 70 feet apart and four others from 20 to 40 feet apart (Exh. 97; Collord Statement of Reasons (C-SOR) at 38). All of the experts who testified at the hearing considered this spacing to be sufficient for the intended purpose, and there is nothing in the record that supports an assumption that closer spacing was necessary. 15/

On September 3, 1986, Thurmond collected seven samples of wall rock and vein material at locations she had previously sampled to see if the wall rock contained values (Tr. 131). The samples were assayed and the results appear in Exhibit H and in Appendix I to this opinion as sample Nos. 4000 through 4006. On July 30, 1987, Thurmond collected three grab samples of "some of the best looking vein material" from the discovery pits (Tr. 133). The samples, identified as sample Nos. 4021, 4022, and 4023 (Tr. 134), were assayed and Exhibit I is a certificate of the assay results. The assay values ranged from 0.160 to 4.700 oz Au/ton. The various samples are identified as "THURMOND" samples in Appendix I.

Hubbard's 12 samples, which "were duplicates in method, location and orientation to those samples taken by the Forest Service" (Hubbard Report or Exh. 49 at 3), were assigned the numbers 1401 through 1413

15/ The concurring opinion suggests that the 5-foot production grade control sample spacing (used to assure optimum mill recovery) is necessary for ore reserve analyses. It then hypothesizes that, because the vein was not sampled at 5-foot intervals, the mineralization is so erratic that the area of influence distances employed by the qualified experts who had visited the claims and physically examined the vein are incorrect. I find no basis for substituting this theoretical postulation for the trained opinion of the qualified experts who physically examined the structure and testified at the hearing.

(Plate 1 of Appendices to Hubbard Report; Exh. 49A). Hubbard's samples were fire assayed and the assay results ranged from 0.001 to 4.185 oz Au/ton (Exh. 49A). The samples are identified as "HUBBARD" samples in Appendix I.

Kemp took composite bulk samples from sites previously showing high grade gold mineralization (greater than 1.0 oz Au/ton) and medium grade gold mineralization (greater than 0.30 oz Au/ton) (Tr. 977-88; Exh. 59 at 4; Exh. 61). The "high grade" bulk sample (7476B) was made up from a 24.8-pound sample from sample site F, and a 24.5-pound sample from sample site G (Exh. 59 at 5). The "medium grade" bulk sample (7476A) was made up from a 12.1-pound sample and a 7.3-pound sample of quartz vein material from sample site K, and a 13.3-pound sample from sample site I. The high grade bulk sample (7476B) had a head assay value of 1.125 oz Au/ton (Tr. 980-81; Exh. 59 at 5) and the medium grade bulk sample had a head assay value of 0.340 oz Au/ton (Tr. 987; Exh. 59 at 5).

Kemp calculated a weighted average of the samples taken by Thurmond, Collord, and Hubbard, and compared the weighted average for the high grade zone (2.241 oz Au/ton) to the bulk sample average for the high grade zone (1.125 oz Au/ton). Kemp made the same comparison for the medium grade zone comparing the weighted averages of the Thurmond, Collord, and Hubbard samples (0.343 oz Au/ton) to the bulk sample average (0.340 oz Au/ton) (Exh. 61). 16/

The bulk sample rejects were used to run cyanide column leach tests and agitated cyanide bottle roll tests (Exh. 59 at 5-6). Kemp also took "three lines of soil samples * * * across the strike of the vein to try to confirm vein continuity or extension under covered areas" (Exh. 59 at 6 and Figure 1).

4. Predictability of Contained Values

Several Board decisions have employed geologic inference, and those decisions were noted in Feezor when we stated:

> While these cases might be read as holding that geologic inference could not be used in situations involving isolated high mineralization, they are better understood as holding that geologic inference, standing alone, is insufficient to establish the existence of a valuable mineral deposit where it is necessary to infer continuity of values at depth where such values have not yet been disclosed. In other words, while geological inference is, in fact, applicable, isolated and erratic high values are simply incapable of giving rise to an inference that better values exist someplace on the claim. In essence, and in practice, geologic

16/ Kemp included some of Thurmond's 4000 series samples, which included wall rock, giving a value which was lower than it would have been if these samples had been excluded.

> inference is primarily applicable as a basis upon which to show continuity of values. Thus, where values have been high and relatively consistent, geological inference can be used to infer sufficient quantity of similar quality mineralization beyond the actual exposed areas, such that a prudent man would be justified in expending labor and means with a reasonable prospect of success in developing a paying mine.

United States v. Feezor, supra at 78-79, 90 I.D. at 274-75. Thus, to the extent that exposures and samples show high values and relative consistency, geological inference can be used to determine the likelihood of the persistence of the exposed mineralization beyond the areas actually sampled and exposed, specifically in this case, at depth. United States v. Feezor, supra at 79, 90 I.D. at 275.

Kemp addressed his estimates of the continuity of the gold mineralization, explaining the difficulty encountered when taking chip samples for gold contained in quartz veins. He noted that:

> Gold-quartz vein systems characteristically show wide variability in grades of gold mineralization and in shapes of the mineralized portions of the vein. The Golden Bear vein follows this pattern. * * * There is marked variability in assays from samples collected at the same site indicating the likelihood of the "coarse gold" or "nugget" effect, a statistical problem frequently encountered in quartz vein systems containing native gold. The gold is not uniformly distributed within the vein material so some samples may be high grade while the next sample from the same site may be low grade or even barren in gold. Bulk samples are the best way to estimate grades in possible "nugget" effect situations.

(Exh. 59 at 7).

Kemp took bulk samples to overcome the difficulties he described and, based on the results of those samples and his review of the assays from the other samples, Kemp identified a consistent trend: "Although exact values vary, all sampling sets confirm the presence of high grade gold values in excess of 1 ounce per ton and medium grade gold values greater than 0.30 ounce per ton over significant portions of the western outcrop area of the Golden Bear vein." Id. That is, Kemp found a consistency in mineralization in the areas of high and medium grade mineralization. According to Kemp, the gold at these sites is visually associated with sulfide clots and aggregates of sulfides that are partially oxidized and appear as quartz surrounded by a rim of oxide (Tr. 914). Examination of the various samples, Kemp states, reveals no obvious control on mineralization. He also deemed it significant that he observed no cross faults, shearing, or change in the alteration pattern in those areas, and stated:

> A lot of times you will get high grade pockets of mineralization where a cross fault might cut a main vein, or where the shearing

> got a bit more intense at one spot, let's say as an example, versus another spot. That sometimes will influence grade within the vein or oreshoot. [17/] In this case it looks to me like the distribution is very uniform. In other words, that actually is an oreshoot within the vein. There's nothing in that outcrop saying this has to be high grade because of some other subsequent feature upon the vein.

(Tr. 914). Kemp opines that the lack of control on the metal implies that the metal will continue to depth (Tr. 915). Individual and bulk sampling, Kemp states, confirms that the Golden Bear vein exhibits zones of mineralization which he defines as "ore zones" within the vein where the high grade mineralization resides. The oreshoots, he states

> are characterized by sulfides, in this case gold. And because of sulfides being a little more abundant in the shoot-like areas you get different effects along in there.
>
> So in other words, one part of the vein would look brown, be more oxidized than another part. It's the same vein, but the other part just doesn't have the sulfides in it * * * the shoot is a thing that is within the vein.

(Tr. 896-97).

Kemp identified a high and medium grade outcropping zone of mineralization within the Golden Bear vein and noted that those zones of mineralization have limited strike lengths within the overall strike length of the vein (Tr. 896-97). Kemp described the high grade mineralized zone as a portion of the Golden Bear vein which carries over 1 oz Au/ton (Tr. 932), and defines the high grade mineralized zone as a portion of the Golden
Bear vein having a strike length of 148 feet (Tr. 931) and including sample sites E, F, and G (Tr. 927; Exhs. 92 and 93). See Appendix I to this opinion. He testified that:

> If we look at sample site GB1-4 [sample site E], that was the Forest Service sample that came back 1.595 ounces per ton. Mr. Hubbard in his sampling got a value of .23 ounces per ton. Mr. Collord, E. J. Collord Junior had a value of .2 ounces per ton. So what I'm saying is, given the existing data that those .2 samples indicate, plus the fact that the Forest Service went

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17/ An "oreshoot" is a large and usually rich aggregation of mineral in a vein extending from wall to wall and having a definite lateral width. It
is usually more or less vertical in nature. As used in the context employed by Kemp in this discussion the term "oreshoot" does not necessarily carry the more restrictive definition of ore as mineral capable of being mined at a profit.

> back and got a 1.595 of it, that indicates that the nugget effect does exist in this particular area. The sample sites GB1-2 [sample site F] and 1-3 [sample site G] all have greater than one ounce assays from every sampler who has ever sampled those two outcrops. That certainly is an outcropping oreshoot.

(Tr. 931).

Kemp defined the medium grade zone of mineralization as a portion of the Golden Bear vein carrying 0.3 oz Au/ton or better (Tr. 933). This zone lies between sample sites I and K, a measured distance of 90 feet (Exh. 59 at 7). "All of the remaining sample sites along the vein carried at least detectable amounts of gold, and many sites assayed with values in the 0.1 to 0.2 ounce per ton gold range" (Exh. 59 at 7).

As previously noted, Kemp took all the samples and calculated an (unweighted (Tr. 944)) average of all other samples (calculated bulk sample) and compared it to the bulk sample that he took. The calculated bulk sample on the high grade ore shoot was 2.241 oz Au/ton. Kemp's bulk sample of the high grade zone averaged at 1.125 oz Au/ton and, in his opinion, 1.125 ounces could reasonably be used when calculating the resource values for that zone of mineralization (Tr. 986-87). Similarly, the weighted average of the medium grade zone of mineralization was at 0.343 oz Au/ton and the bulk sample which Kemp took for the medium grade zone of mineralization assayed at 0.340 oz Au/ton (Tr. 987-88). Kemp considers 0.3 as a good average for the medium grade zone of mineralization (Tr. 988).

The Forest Service did not controvert Kemp on cross-examination or rebut his opinion as to the existence of a high and medium grade zone of mineralization. While the Forest Service questioned whether 1.125 oz Au/ton represents the floor for the high grade zone of mineralization (Tr. 994-995), it neither introduced evidence nor submitted assays in support of its contention. In fact, the assays of the Forest Service independent samples indicated values in excess of those identified by Kemp as representing the estimated value of the high and medium grade shoots.

Table 2 of the Forest Service's February Report (Exh. 73A at 23-24) lists the sample sites along the westerly portion of the exposed vein, including all of the Forest Service sample sites on the Golden Bear No. 1 claim (identified on Appendix I below as sites A through H) and three sample sites on the Golden Bear No. 2 claim (identified as sites I, J,
and K). Three sample sites on the Golden Bear No. 2 claim are within the easterly exposure (sites N, O, and P). The record clearly demonstrates the existence of sampling at relatively regular intervals along the vein within Blocks I and II. The vein exposures along the portion of the strike length within those blocks had been sampled by E. J. Collord, Hubbard, and the Forest Service, and the sample intervals are discussed above and set out in the first column Appendix I. E. J. Collord and the Forest Service sampled the wall rock in the area of those exposures. Kemp conducted a bulk sampling program and sampled the soils surrounding various sample sites. Four

qualified geologists who took the samples also took and recorded extensive measurements. Collord, the Forest Service, Hubbard, and Kemp all measured the width, strike, and dip at all sample points and measurements were taken at other points along the vein which were not sampled.

Collord has shown by a preponderance of the evidence that it is reasonably likely that values shown in the surface samples will persist to some depth and that the geologic setting supports projecting to a depth equal to one-half the strike length of their surface zone of influence,
a practice which is acceptable in the industry.

The tonnage contained in each sample block is calculated by multiplying length by depth by vein thickness at the sample point and applying a tonnage factor (12.5) used by the experts testifying at the hearing. This was derived by estimating the number of cubic feet of 1 ton of ore in place, using the specific gravity of the material to be mined (Haskins, et al. (1984) at IV-B). Finding the average grade of the mineral in place is not that simple, however, as the sample sites have varying zones of influence requiring a weighted average grade calculation. 18/ Although the weighted average grade plays an important part in the final analysis, the grade of similar blocks identified by Thurmond as Block I and Block II are deemed acceptable for the preliminary calculations. 19/

5. Summary

Two indicated resource blocks exist on the Golden Bear claims;

Resource Block 1:	A block of mineralization on the Golden Bear Nos. 1 and 2 claims, 460 feet long, 230 feet deep and 2 feet thick containing approximately 15,800 tons of mineralization averaging approximately 0.6 oz Au/ton.
Resource Block 2:	A block of mineralization on the Golden Bear No. 2 claim, 210 feet long, 105 feet deep and 1.5 to 2 feet thick containing approximately 3,500 tons of mineralization averaging 0.056 oz Au/ton. 20/

18/ A point completely missed in the lead opinion.
19/ I do so because all parties recognized that, taken as a whole, those blocks of mineral material could not be classifiable as a reserve. They also recognized that these blocks contained zones with higher grade mineralization.
20/ The actual measurement between sample points was 207 feet. A 3-foot extension beyond the sample points is deemed reasonable, considering the depiction of the exposures shown on Exhibits 88 and 92.

D. Mineral Reserve Analysis

1. General Background

Having classified two segments of the vein as probable mineral resources, the focus shifts from a geologic analysis to an economic analysis to determine whether either, both, a part of either, or a part of both can be classified as a mineral reserve. By definition, reserves based upon indicated mineral resources are "probable reserves."

Making a reserve evaluation is a bit of a juggling act when the mineral resource is not part of a developed mine. One must select a set of preliminary assumptions regarding plant design and make an initial reserve calculation to decide whether to start mine development. In a typical scenario, a mine plant and mining method are chosen. The cost of removing the mineral material and estimated recovery rate is then estimated for the mining method selected. The estimated grade of the material to be mined is used to estimate the value of the mineral material in place. The value of the material in place is compared with the mining cost.

It may be found that the production method initially chosen will not allow profitable recovery of the mineral material. At this point the mineral resource block is reexamined and lower grade portions are eliminated, with eliminated portions being deemed submarginal. This results in a smaller, but higher grade resource block to be analyzed. The evaluation process starts over again, and a mining and beneficiation method is chosen, keeping in mind the size of the mineral resource block being examined. If there is room in the operator's (corporate) policy for a extraction method giving a slower rate of return, lower return on investment, or expenditure of manpower on small operations, the process is repeated until the evaluator develops a mining and processing plan that permits removal of a mineral resource at a profit. 21/

In a mineral examination to determine whether a discovery exists on
a mining claim, the "policy" is well established. The determination is whether "minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine." Castle v. Womble, 19 L.D. 455 at 457 (1894). In United States v. Rice, 73 IBLA 128 (1983), we noted that it does not

21/ The fallacy of the approach announced in the lead opinion becomes obvious. The basis for the entire economic analysis set out in that opinion was that "[a] prudent miner would mine the ore on the adjoining claims by underground methods" (Lead Opinion at 278). This key finding is neither explained nor supported. Collord noted what is obviously the least expensive mining method for a shallow deposit when he stated that the upper portions of the vein could be mined in an open cut (Tr. 650). No mention, let alone consideration, of this mining method can be found in either the lead or concurring opinion.

matter what the claimant may be willing to accept in the way of compensation for his labors. The test is what a prudent man would do. It is equally true that, because a discovery test is based upon what a prudent man would do, it is improper to base a discovery determination on an imprudent claimant's statements regarding a proposed mining or processing method. 22/

For a mineral contest the economic viability test has another limitation not often recognized by claimants when presenting evidence. In a mining claim contest there is no tomorrow. The mining and processing scenario should focus only on the mineralization that can be identified or reasonably projected at the time of the hearing, as if there is no possibility of exposing additional mineralization during the course of development. Thus, a mine plan calling for drifting for some distance along the vein, with an altogether reasonable expectation that additional high grade zones will be disclosed, should be abandoned if mining only the exposed mineralization results in a loss. 23/

22/ Thurmond recognized that a prudent miner would not mine areas having low gold values, but explained that she included those areas when making her calculations because a Collord representative said that "Mr. Collord's plan is to mine from [the] ridge line near the west end line of the Golden Bear 2 to the discovery pits on Golden Bear 1" (Tr. 260, 1210). She states: "I don't think that's prudent, no" (Tr. 260). Thurmond admitted that she chose the mining plan she used because it was the one described to her. A mineral examiner cannot discharge the Government's burden of proof by merely showing that an imprudent mining plan would fail. The standard for discovery set out in Castle v. Womble, supra, mandates that the focus be on what a person of ordinary prudence would do. A mineral examiner is required to examine viability using a mining plan developed by a individual of ordinary prudence. Thurmond's reason for using shrink stope mining rather than resuing was also that one of Collord's party had proposed it. See Tr. 247-48. If Thurmond could recognize that it would be economically prudent to adopt a mining plan other than the one proposed, she should have rejected the one proposed. Wallace's initial reserve calculation was similarly flawed. He assumed a miner would mine all the ore in an area roughly equal to mineral resource block 1, even though it includes areas having only a trace of gold (Tr. 324-26). Wallace also admitted that a prudent miner would not mine several thousands of tons of material containing only a trace of gold (Tr. 326).

23/ A Collord witness expressed the opinion that a prudent man would drive a drift along the vein in the manner described in Thurmond's mineral report. The basis for this conclusion was his belief that there was a sufficient probability that further high grade mineral zones would be intersected in the drift. To the extent that the mining operation supports a drift, his statement is well taken. In an operation such as this one a prudent miner would lay out a mining plan that would expose additional vein material in the production drift, rather than driving a crosscut through barren ground, if doing so would not result in a loss.

Two further factors should be noted before commencing an in depth cost analysis. First, this contest involves two claims that can logically be developed as a single mine. When considering the concept of a single "mine," composed of more than one mining claim, this Board has observed:

> While the proof of quantity and quality are often interrelated, a claimant must prove that a valuable mineral is actually present on each of the claims. Once mineral is demonstrated to be present, the proof of sufficient quality and quantity of mineral to warrant development can take into consideration the overall mining operation. There is little question that circumstances exist in which a group of mining claims containing low grade ore can support a mining operation, and thus demonstrate a discovery on each claim, even though taken individually the claims might not contain sufficient quantity of ore of sufficient quality to support discovery.

Cactus Mines Limited, 79 IBLA 20, 32 n.2 (1984). See also United States v. Foresyth, 100 IBLA 185, 250, 94 I.D. 453, 489 (1987); United States v. Dresselhaus, 81 IBLA 252 (1984); cf. United States v. New York Mines, Inc., 105 IBLA 171, 191, 95 I.D. 223, 234-35 (1988). There is no reason to confuse this simple concept. A prudent miner often undertakes development of a group of claims when none of the individual claims would support the mining operation that has been undertaken. When the rock contains a mineral or element that can be marketed, the question is whether it be extracted and sold at a profit, and the question asked by all prudent miners is "[w]ith what I have, can I go after that mineral and make money?" It is only after that question has been answered that a prudent miner will address secondary issues, such as the location of the claim boundaries. 24/

A scenario for mining the indicated resource blocks (or a part of them) as a single mine, thus spreading the pre-production costs of the road and site preparation, and costs such as development, reclamation, and capital costs over the production from both blocks is reasonable if it increases the overall profitability of the mine. The test set out in Castle v. Womble, supra, is whether a prudent man would develop a mine,

24/ It is often the case that it is not economically feasible to develop a mine until the operator has unitized a block of claims large enough to support the operation. Similarly, a miner holding a block of claims does not design a mine plant suitable for mining one claim and then retrofit the plant to permit mining the other claims in the block. Questions such as what claims are "independent," what claim is the "carrier," and which claims are "carried" are simply not considered. In a reserve estimate exercise, the location of claim or property boundaries is important only when determining whether additional property must be acquired to support the proposed mining operation. A prudent miner will mine all of the mineral that can profitably be mined, regardless of where the internal claim boundaries might lie.

rather than whether he would develop a claim. By spreading the indirect, capital, and/or fixed costs over a larger tonnage, lower grade resources can often be mined at a profit.

The second factor, which is never acknowledged in the lead opinion and denied in the concurrence, is that the claimant need not demonstrate that a profit is assured. The claimant need only demonstrate "a reasonable prospect of success, in developing a valuable mine." Castle v. Womble, supra, (emphasis added). By its very nature, mining is a high risk venture. The Castle v. Womble decision recognized and made allowance for this fact of life. Concomitant with any reasonable prospect of success is the possibility of failure. This is equally true for when one considers investing in a McDonald's franchise, and a miner should not be required to demonstrate a greater degree of prudence than a person seeking to make a further expenditure of his labor and means to open a McDonald's restaurant. A critical examination of both the lead opinion and its concurrence clearly demonstrates that the authors of those opinions seek to impose a standard more aptly defined as "an absolute assurance of success." 25/

2. Mining Plan Selection

a. Mining the Resource Blocks in their Entirety

An initial mining plan selection may consist of a plan to mine the two indicated resource blocks in their entirety. This analysis is more or less the same as that conducted by Thurmond. However, after she determined that the indicated mineral resources could not be mined in their entirety, she went no further. During the hearing all of the parties agreed that the conclusion she reached was correct. That is, neither indicated mineral resource block could be mined in its entirety at a profit. This being the case, I find no reason to conduct this analysis.

b. Further Analysis - Mine High-Grade Zones Only

Two zones of mineralization were found within mineral Resource Block 1. Both contain a substantially higher grade of mineralization than the average grade of that block. Thus if the portions of that reserve block containing lower values were eliminated, the resulting value per ton of material in place would increase substantially.

25/ As noted above, the claimant must show that the exposed mineral can be mined at a profit. If we are to consider whether the miner's profit is "large enough," we must also factor in, as a credit, the possibility of developing additional ore. Conversely, if the distinct possibility that additional ore will be found on the Golden Bear claims cannot be considered, it is improper to declare those claims invalid because the profit is "not large enough." Prudent miners often commit to development based upon a reasonable expectation that additional ore will be exposed. See discussion in Yankee Gulch Joint Venture, 113 IBLA 106 (1990).

i. Zone 1-A (High-Grade Zone)

This zone of mineralization is supported by the samples taken at sample sites E, F, and G. The numeric average value assay results for those sample sites is 0.675 oz Au/ton at sample site E; 1.976 oz Au/ton at sample site F; and 2.510 oz Au/ton at sample site G. The value of the ore in place cannot be determined by a numeric average, as was done in the lead opinion, however. See McKinstry's discussion on pages 59-66 of his text, supra. A weighted average of the values must be determined to account for size of the respective areas of influence. 26/ All of the expert witnesses accepted an area of influence for each sample equal to a length determined by measuring along the vein for one-half the distance between sample sites. Using the same basis as was used when calculating the size of the resource blocks, the amount and value of the mineral contained in Zone 1-A can be calculated. This zone is 153 feet long, 2 feet wide, and 76 feet deep. It contains 1,854 tons of vein material containing 1.720 oz Au/ton.

ii. Zone 1-B (Medium-Grade Zone)

This zone of mineralization is supported by the samples taken at sample site K. The numeric average of the assay results for this sample site is 0.412 oz Au/ton. 27/ The length of this zone is strongly influenced by the area of influence determination because of the distance between sample sites. I accept the principle of, but not the result of, the premise proposed by Collord's witness, Kemp (Tr. 938). The distance between sample sites J and K is 40 feet and the zone of influence on that side of the

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26/ The horizontal areas of influence are graphically shown on Exhibit 93, prepared by Thurmond.

27/ Sample No. 4005 must be excluded when calculating the numeric average of the assay results for the vein at sample site K. On Sept. 3, 1986, Thurmond returned to the claims to "sample some of the wall rock material" and took seven samples (Tr. 131). When asked "[c]an you identify which samples were of wall rock by Sample No.?," (id.) she identified sample Nos. 4000 through 4006 (Tr. 131 and 132, and set out in further detail in footnote 7 of the concurring opinion, at 300). Any confusion that may have been caused by that portion of Thurmond's testimony quoted in footnote 7 of the concurring opinion was dispelled by her subsequent testimony. Exhibit H is the report of assay results for Thurmond's sample Nos. 4000 through 4006. Thurmond was asked, "On Exhibit H you show seven assays, essentially of wall rock, but in some cases of vein material included with wall rock, is that correct?" She responded "[c]orrect" (Tr. 151 (emphasis added)). Sample No. 4005 is of a section of wallrock containing some vein material, or best, an unknown quantity of vein material contaminated with wallrock. A comparison of the assays of samples from sample site K (see Appendix I) bears this out. It is patently incorrect to consider sample No. 4005 representative of the vein material at sample point K, and it must be excluded. See Handbook for Mineral Examiners, BLM Handbook 3890-1, Release 3-234, at VI-1 and VI-2. Further, no sample length was given or recorded for sample No. 4005, its length is unknown, and it cannot be used for average grade calculations. See Handbook for Mineral Examiners, supra at V-2.

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sample is 20 feet. Adopting an admittedly extremely conservative approach to illustrate the point I am making in this dissent, I will use one-half the distance between sample sites K and L (48 feet) 28/ for the zone of influence determination, rather than 145 feet (one-half the distance between sample sites K and M (290 feet)), the distance used by Kemp, or 250 feet (one-half of the distance between sample sites K and N (500 feet)), as Thurmond did. Mineralized Zone 1-B is 68 feet long, 2 feet wide and 34 feet deep. It contains approximately 370 tons of mineral material containing 0.412 oz Au/ton.

c. Value of Mineral in Place

Because of the nature of the complaint, the value of the mineral in place must be determined using two gold prices: $381.50 per ounce, the price on December 31, 1983; and $330.66, which is the price used in the lead opinion. See footnote 13 in the lead opinion. The value of the mineral in place in the two zones is:

Value at $381.50 per ounce:

	Oz Au/ Ton	Tons in Place	Gross Value of Mineral in Place
Zone 1-A	1.720	1854	$1,217,000
Zone 1-B	0.412	370	58,000

Value at $330.66 per ounce:

	Oz Au/ Ton	Tons in Place	Gross Value of Mineral in Place
Zone 1-A	1.720	1854	$1,054,000
Zone 1-B	0.412	370	50,000

d. Lead Opinion's Mining Plan

I find it appropriate to note a few aspects of the mine plan selected by the lead opinion. Many of the factors that go into the selection of an overall mine plan are so interrelated that if one is changed, the examiner must take care to consider the effect of that change on all other factors. Care must be taken not to overlook this cause and effect problem when modifying a mining plan.

The lead opinion selected an underground mining method consisting of running a access drift or crosscut (I am not sure which since these terms are interchanged at will in that opinion) to some unspecified point in the vein and then to and through what is identified as the high-grade zone then to and through what is identified as the medium-grade zone. The

lead

28/ A note of explanation is warranted. Sample site L was identified and described by Collord. He failed to take a sample from this site, however, and I will conservatively assume for the purpose of this analysis that the values at that site were submarginal.

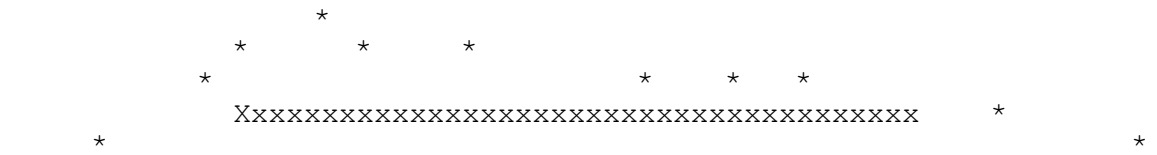
opinion does not specify where this crosscut/drift is collared, and it is impossible to tell where, or at what depth, it intercepts the two zones.
It may be a development program almost identical to that used by Thurmond for mining the resource blocks in their entirety and may be somewhat like a program proposed by E. J. Collord, I just do not know. At any rate, Thurmond's exercise was abandoned by all parties, including the Forest Service, early in the hearing, and Collord contemplated intersecting the vein at a greater depth than is necessary to mine Zones 1-A and/or 1-B.

While I find no fault with the lead opinion's choice of a 10-percent dilution factor, the use of that factor is in error. To compensate for dilution the lead opinion reduced the value of ore in place by 10 percent. However, the concomitant increase in tonnage mined is totally ignored when calculating the per-ton indirect and capital costs, leaving each and every one of those calculations in error.

There are other errors of logic in the lead opinion analysis which I will note during the course of my analysis.

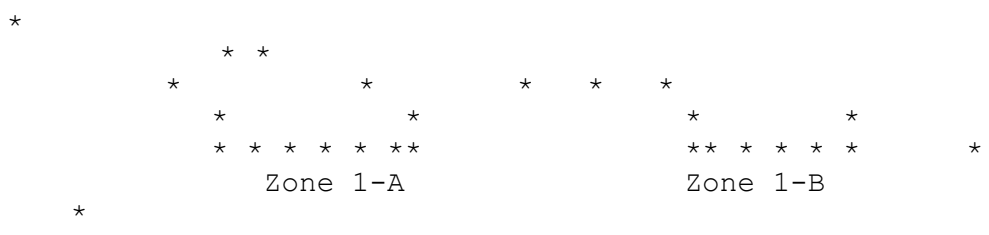
e. Mine Plan for Underground Development of Zones 1-A and 1-B

The Golden Bear vein runs along the side of a ridge. Because of its strike and dip in relation to the elevation changes, in longitudinal section the apex of the vein is depicted (from west to east) as being upon the sharp nose of the ridge, crossing over the ridge and then raking downward at a slight angle. Roughly the apex is depicted on Exhibit 88 as looking somewhat like this:



(not to scale)

The adit initially proposed by Thurmond is shown as a series of "x"es above. More important is the couture of the apex in the area of Zones 1-A and 1-B. The longitudinal section of that section of the vein looks approximately as depicted below:



(not to scale)

Instead of driving a drift through 155 feet of waste before intersecting mineralization, the 8- by 8-foot access opening can be driven the opposite direction a distance less than 70 feet, or as a crosscut, or by drifting along the vein, and intersecting Zone 1-B at the bottom of that zone at

a point approximately at reference point 5.00. See Appendix I. The drift along the vein would continue through that zone for a distance of 68 feet, and then continue for a distance of about 128 feet to Zone 1-A. It would then continue for 153 feet through that zone and for 10 additional feet of tail drift. The total length of this adit would be approximately 430 feet. A raise would be driven from the adit level to the surface in both zones for a total length of approximately 100 feet. Both the drifts and the raises would be driven in the mineral zones, and the mineral recovered. 29/

i. Direct Costs

i(1). Mine Development Costs

Zone 1-A Only

Item	Estimated Cost/Foot	Total Feet	Total Cost 30/
Adit	$84 31/	430	$36,000
Raises	$84	69	6,000
Total			$42,000

Zone 1-B Only

Item	Estimated Cost/Foot	Total Feet	Total Cost
Adit	$84	150	$13,000
Raises	$84	26	2,000
Total			$15,000

Both Zones

Item	Estimated Cost/Foot	Total Feet	Total Cost
Adit	$84	430	$36,000
Raises	$84	94	8,000
Total			$44,000

29/ If the elevation differential alleged in the concurring opinion existed and posed the "unsurmountable" problem alluded to in that opinion, there is no reason why Zone 1-B could not be profitably mined in a slusher stope from the surface. See Tr. 650. That method is clearly less costly. However, additional vein material would not be exposed, and the distinct possibility of finding additional ore in the drift would be lost.

30/ My estimates are rounded. I do not profess the ability to predict mining and milling costs to the nearest cent.

31/ Contrary to the allegation in the concurring opinion, Collord's estimated drift cost was not used because it included indirect costs addressed later in this analysis. If Collord's cost figure is substituted for the one chosen, those costs would be double charged.

i(2). Mining Costs

After the adit and Zone 1-A raise is complete the remaining material would be extracted from that zone, using the resuing mining method. 32/ The Zone 1-B raise would then be driven and the remaining ore in that zone would be mined. A total of 1,578 tons would mined from Zone 1-A and 250 tons would be mined from Zone 1-B using this mining method. 33/ The direct mining costs I find the most reliable and detailed are found in Exhibit 85, prepared by the U.S. Bureau of Mines at the request of the Forest Service. 34/

	Cost/Ton
Labor Cost	$ 25.79
Equipment	2.37
Supplies	5.51
Sub total	$ 33.67
Contingency (10%)	3.37
Total	$ 37.04

Direct resuing costs would be as follows:

	Cost/Ton	Tons Mined	Total Cost
Zone 1-A only	37.04	1578	$59,000
Zone 1-B only	37.04	250	9,000
Both Zones	37.04	1828	68,000

Total direct mine costs are as follows:

	Zone 1-A Only	Zone 1-B Only	Both Zones
Development Cost	42,000	15,000	44,000
Mining Cost	59,000	9,000	68,000
Total	$101,000	$24,000	$112,000

i(3). Milling Costs

The mined material would be hauled to the millsite, and crushed. The gold values would then be removed by gravity separation on a Wilfey table,

32/ I select the resuing mining method, even though I totally disagree with the finding in the lead opinion that "resuing will result in lower mining cost because it will involve less time and effort [than shrink stope mining]" (Lead Opinion at 280). The savings results from being more able to selectively mine and by avoiding major dilution. Resuing is neither easier nor faster.

33/ The stoping cost calculations in the lead opinion effectively charged the property twice for mining the mineral material removed from the adit and raise.
34/ The lead opinion failed to note that Collord's $74.42-cost per ton for resuing included indirect mining costs. As a result, indirect costs were charged twice. Compare note 29.

spirals or other gravity method. The final selection would depend on bulk testing of gold bearing vein material removed during development. For the purpose of this exercise, a table will be used. Again I will use the Bureau of Mines direct cost figures. The tonnage of ore transported to the mill and milled is increased and the grade decreased by 10 percent to reflect dilution during mining.

	Cost/Ton
Labor Cost	$ 13.46
Equipment	12.60
Supplies	0.09
Sub total	$ 26.15
Contingency (10%)	2.62
Total	$ 28.77

Milling Direct Costs

	Cost/Ton	Tons Milled	Total Cost
Zone 1-A only	28.77	2046	$59,000
Zone 1-B only	28.77	350	11,000
Both Zones	28.77	2396	70,000

The cost of transporting the material from the mine to the mill are included in the milling costs. See Exh. 85 at 3.

i(4). Summary

Total Direct Costs

	Mining Costs	Milling Costs	Total Cost
Zone 1-A only	$101,000	$59,000	$160,000
Zone 1-B only	24,000	11,000	35,000
Both Zones	112,000	70,000	182,000

ii. Indirect Costs

ii(1). Road Costs

The lead opinion discusses the various estimates of the cost of road construction and maintenance and concludes that the cost estimates advanced by Collord were the most representative of what could reasonably be expected. I have no quarrel with that finding. As noted earlier, to place the portal of the mine in the position discussed in the lead opinion does not result in the most efficient or inexpensive mining

operations. To place the portal in the proper place the road must be extended a short distance around the side of Ramsey Ridge. This road realignment can best
be visualized by examining the contour map which is a part of Exhibit 77D. I find it proper to increase the road construction amount from $36,500 to

$50,000 to reflect anticipated additional costs, and for site preparation at the portal. I will also estimate the rehabilitation costs for the first portion of the road at $20,000.

I find Collord's estimate of road maintenance reasonable. Rounding his estimate off and projecting a four-summer life, I find $8,000 a reasonable estimate.

ii(2). Permitting Cost

The lead opinion accepts Collord's estimate of the permitting cost. Considering the degree of cooperation shown by the Forest Service, I
believe this amount to be optimistic. A $10,000 estimate is more realistic, and may be low. 35/

ii(3). Reclamation

Based upon Collord's estimate the reclamation costs will be approximately $25,000.

ii(4). Total Indirect Costs

Allocation

Item	Total	Zone 1-A	Zone 1-B
Road Construction	$70,000	3 6 /	
Road Maintenance	8,000	$ 6,000	$ 2,000
Permitting	10,000		
Reclamation	25,000	15,000	10,000
Total	$113,000		

iii. Capital Costs

In the lead opinion capital costs of $163,185 are determined by taking the capital cost (before contingency factor) found on page 27 of Exhibit 66A ($373,475) and deducting the line item titled Road and Mine Development ($231,575) and multiplying the remainder by 1.15 to allow for a contingency factor.

Included in the capital cost estimates found in the lead opinion is a $19,000 charge for camp facilities on the Golden Bear millsite, including

35/ This is hardly a figure most favorable to the claimant. An examination of the record will show that almost all are not. Compare Routson's testimony (Tr. 467-98).

36/ For the most part, these indirect costs will not vary much depending upon the mining of a single or both zones of mineralization. However, I find it reasonable to allocate three-fifths of the road maintenance and reclamation costs to mineralized Zone 1-A to take into consideration the effect of mining only one zone on the life of the operation.

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radio communications, a generator, and a trailer, with a combined capital cost of $8,000. 37/ All of the mine equipment, valued at $23,000, with the exception of items costing approximately $8,000, is readily salvageable at the end of mining operations. Similarly, of the mill equipment listed with a combined value of $62,000, all but $28,000 is readily salvageable. All of the $37,000 worth of "other" equipment is readily salvageable. Therefore, of the $142,000 in plant machinery and equipment making up the capital cost, machinery and equipment with an estimated value of $94,000 is readily salvageable. These costs are treated in the lead opinion in a manner that would only lead to the conclusion that Collord would totally abandon this equipment after completing the mining operations, even though the mine life is very short. I deem a 25-percent salvage value reasonable. The capital costs chargeable to the property are therefore estimated to be $118,000. Adding the contingency I find a more realistic capital cost to be $136,000.

iv. Total Estimated Costs

	Direct Costs	Indirect Costs	Capital Costs	Total
Zone 1-A only	$160,000	$101,000	$136,000	$397,000
Zone 1-B only	35,000	92,000	136,000	263,000
Both Zones	182,000	113,000	136,000	431,000

As can be seen at this point in the investigation, if mineralized Zone 1-B were the only mineralization being considered, it would not support a discovery. However, the test is whether the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success
in developing a valuable mine. To answer that question the examination must be taken further.

f. Adjustments to the Value of the Mineral in Place

As noted in the lead opinion, not all of the mineral values in place will be recovered during the mining and gravity milling operation. Collord estimated the loss of mineral values to be approximately 15 percent. 38/ Therefore, the following adjustment must be made to the value of the mineral in place:

37/ No consideration seems to have been given to the need for these expenditures in light of either the majority opinion or the concurrence finding that the millsites are invalid, precluding Collord from building the camp.

38/ In an apparent attempt to cover all bases, the lead opinion made an additional deduction based upon the losses that would have been realized if the mined material had been milled in a cyanide vat leach plant, rather than tabled. There is no reason to make a deduction for cyanide circuit losses when that process is not used.

Value at $381.50 per ounce:

	Gross Value of Mineral in Place	Value of Mineral Lost	Value of Recovered Mineral
Zone 1-A	$1,217,000	$183,000	$1,034,000
Zone 1-B	58,000	7,500	49,000

Value at $330.66 an ounce:

	Gross Value of Mineral in Place	Value of Mineral Lost	Value of Recovered Mineral
Zone 1-A	$1,054,000	$158,000	$896,000
Zone 1-B	50,000	7,500	42,500

3. Net Profit (Loss) from the Golden Bear No. 1 and Golden Bear No. 2 Claims

Value at $381.50 per ounce:

	Gross Value of Recovered Mineral	Total Cost	Net Profit (Loss)
Zone 1-A	$1,034,000	$397,000	$637,000
Zone 1-B	49,000	264,000	(215,000)
Both Zones	1,083,000	431,000	652,000

Value at $330.66 an ounce:

	Gross Value of Recovered Mineral	Total Cost	Net Profit (Loss)
Zone 1-A	$896,000	$397,000	$499,000
Zone 1-B	42,500	264,000	(221,500)
Both Zones	938,500	431,000	507,500

There is nothing in the law that dictates that only giant corporations can hold mining claims. Indeed, one need only examine the lore of the west to dispel that notion. The law was clearly intended to

allow for small, individual, "mom and pop," and family owned and operated mines. In previous cases this Board has recognized that a mining claim can legitimately be mined by an individual, as a "mom and pop" mining operation, or as a family operation. See, e.g., Lloyd L. Jones, 125 IBLA 94 (1993); Jim D. Wills, 123 IBLA 74 (1992); Edmund Key, 117 IBLA 274 (1991). However, there must be a showing that, if mom and pop make further expenditure of their labor and means, they have a reasonable prospect of developing a valuable mine. It is clear from the testimony presented by the Collords and their witnesses that the Collords intend to run their mine as a family operation. See Tr. 664, 839, 1060, and 1160.

When analyzing whether it would be prudent for a claimant to develop a small mine on the claims the Board has often compared the out-of-pocket

expenses to the return to the owner. United States v. Laczkowski, 111 IBLA 165 (1989); United States v. Rice, 73 IBLA 128 (1983). This analysis has been couched in terms of the per-hour net return. United States v. Laczkowski, supra. We have often asked whether the claimant would make a reasonable wage, and have found that a per hour return less than minimum wage is not sufficient. United States v. Johnson, 59 IBLA 207, 208 (1981); United States v. Rouse, 56 IBLA 36, 40J (1981); United States v. Corns, 53 IBLA 5, 14 (1981).

When undertaking the above analysis I attempted to use the most representative cost estimates presented by expert witnesses during the hearing, trying to avoid cost estimates which were inflated or overly optimistic, and when two were found to be equally supported by the record I selected the least favorable to the claimant. Labor costs used in this analysis were based upon the estimated going rate for skilled mine and mill labor in the area of the mine at the time of the hearing. In some ways a family mine is similar to a Subchapter S corporation. To the extent that the claimants and their immediate families contribute labor which has been charged as a cost in the cost estimations, the claimant's "profit" must include the "wage" they pay themselves. 39/ Thus, when my colleagues consider the entire labor cost as an expense, which must be recouped by the Collards before a profit can be realized, they totally ignore the primary measure of profitability for a family run and owned business, whether it be a mine, grocery store, or flower shop. Surely, a family operated mine that returns the mining costs, allows a total return of capital, and pays its owners a wage at the going rate for the life of the mine is a reasonably prudent investment. The additional sum realized by the family in the form of a "profit," as my colleagues define that term, is more like a dividend in a family run business.

In summary, it would be profitable to mine the mineral material from the indicated reserve identified as Zone 1-A. I do not find it profitable to mine the minerals found in mineral resource Zone 1-B, if that zone is mined alone. The claimant can pay all expenses, including the payment of wages to himself and members of his family, calculated at the going rate of pay for the work performed, and can realize a small additional profit from the ores removed from Zone 1-B by developing and mining the two zones together. A prudent person would expect a reasonable probability of success when developing a mine to mine ores located on both claims.

V.

Conclusion

It is clear that the Golden Bear No. 1 claim is valid. It would be difficult to find it imprudent to develop a 1,984-ton surface outcropping

39/ It is clear from the record that members of the Collord family have many of the skills necessary to operate and manage a small family owned mining operation.

deposit having an average grade of 1.72 oz Au/ton. By selecting a reasonable mining method and costs, and recognizing the nature of this family owned and operated mine, I have found the Golden Bear No. 2 claim to be valid as well. 40/ The weight of the evidence supports the conclusion
that if the Collords make further expenditure of their labor and means they have a reasonable prospect of developing a valuable mine on the Golden Bear No. 1 and Golden Bear No. 2 claims.

In a number of cases this Board has embraced the finding in McClarty v. Secretary of the Interior, 408 F.2d 907 (9th Cir. 1969). In that case the court remanded the case to permit consideration of an issue not addressed
in the decision on appeal. I find it inappropriate to declare the Golden Bear No. 2 claim or the millsites invalid without affording the Collords the benefit of a further hearing and decision by a trier of fact. By selecting other values and costs, the lead opinion and the concurring opinion present scenarios which, on their face, support the finding set out in those opinions. They also make allegations regarding errors and oversights in my analysis, based primarily upon my selection (or rejection) of various facts presented at the hearing. In spite of the suggestion that our disagreement regarding the applicable facts and the technically complex engineering analysis is so minor as to have no bearing upon the results, the drafters of those opinions cannot avoid one undeniable fact. The collective weight
and length of the opinions making up this decision strongly highlight the existence of many material issues of fact not addressed by Judge Sweitzer. It is my opinion that we cannot and should not declare the Golden Bear
No. 2 claim or the millsites invalid without a further hearing on the record before an Administrative Law Judge who would be able to weigh the facts and testimony presented to him. Of equal importance -- the Judge will be able to obtain expert testimony regarding the acceptability and viability of technical engineering analysis based upon those facts, and the person giving that testimony will be subjected to cross examination. I can think of no better reason for a hearing than the application of a zone of influence "rule" not present or acknowledged in the record, when "no hard and fast rule can be fostered with respect to the proper area of influence" (Concurring Opinion at 298).

R. W. Mullen
Administrative Judge

40/ There is no question that the Collords have clearly overwhelmed the Forest Service case, and satisfied their burden of proof. They need not carry an additional burden of showing that claim is valid based upon evidentiary standards of certainty imposed after the hearing.

APPENDIX I

FIRE ASSAY RESULTS - GOLDEN BEAR #1 AND #2 CLAIMS
(Sample sites listed west to east along Golden Bear vein)

Golden Bear No. 1 Claim

Sample Site	x 100' (Note 1)	Location Sample Number	Sampler	Vein Width	Assay Value Oz Au/Ton
A	0.00	GB1-6	THURMOND	1.5'	0.130
			1410	HUBBARD	2.0'
	0.036				
			GB 81-17	COLLORD	2.0'
	0.170				
B	0.70	none	COLLORD	1.8'	
C	0.92	none	COLLORD	1.5'	
D	1.30	GB1-5	THURMOND	1.8'	trace
			4000	THURMOND	?
	trace				
			1409	HUBBARD	2.0'
	0.104				
			GB81-16	COLLORD	2.0'
	0.244				
E	1.70	GB1-4	THURMOND	2.25'	1.595
			4001	THURMOND	H W
	trace				
			4002	THURMOND	Note 2
	0.280				
			4003	THURMOND	Note 3
	0.080				
			1408	HUBBARD	3.3'
	0.230				
			GB81-15	COLLORD	2.8'
	0.200				
F	2.25	GB1-2	THURMOND	0.7'	1.290
			4021	THURMOND	Grab
	0.860				
			1406	HUBBARD	0.7'
	2.637				
			GB81-14	COLLORD	0.7'
	2.000				
G	2.95	GB1-3	THURMOND	2.0'	1.250
			4022	THURMOND	Grab
	4.700				
			1407	HUBBARD	2.2'
	4.185				
			GB81-12	COLLORD	2.2'
	2.090				
			GB81-13	COLLORD	H W
	0.016				

H	3.10	GB1-1	THURMOND 4023	2.7' THURMOND	0.065	Grab
0.160						
			1405	HUBBARD		3.0'
0.054						
			GB81-11	COLLORD		3.0'
0.470						

Note 1. Distances from Exhibit 97. Compare Exhibit G and Attachment I to lead opinion (source unknown).
Note 2. Vein material from a small vein which had split off the main vein (Tr. 131-32).
Note 3. Footwall and 4 inches of vein material not included in the previous sample (Tr. 132).

Golden Bear No. 2 Claim

Sample Site	Location x 100'	Sample Number	Sampler	Vein Width	Assay Value Oz Au/Ton
I	3.75	GB2-4	THURMOND	1.9'	0.050
			1404	HUBBARD	2.0'
0.434					
			GB81-10	COLLORD	2.0'
0.246					
J	4.10	GB2-3	THURMOND	0.9'	0.005
			1403	HUBBARD	1.0'
0.017					
			GB81-9	COLLORD	1.0'
0.032					
			GB81-8	COLLORD	0.3'
					0.018
K	4.50	GB2-1	THURMOND	2.1'	0.675
			GB2-2	THURMOND	2.1'
0.160					
			4004	THURMOND	H W
trace					
			4005	THURMOND 4	Note 0.010
			4006	THURMOND	F W trace
			1401	HUBBARD	2.25'
0.513					
			1402	HUBBARD	2.25'
0.546					
			GB81-1	COLLORD	2.7'
0.552					
			GB81-2	COLLORD	1.8'
0.026					
			GB81-3	COLLORD	F W
0.004					
L	5.46	none	COLLORD	Note 5	
M	7.40	GB81-4	COLLORD	1.0'	0.004
N	9.45	GB2-5	THURMOND	2.0'	0.095
			1411	HUBBARD	3.0'
0.080					
			GB81-5	COLLORD	2.2'
0.064					
O	9.85	GB2-6	THURMOND	1.3'	0.105
			1412	HUBBARD	1.5'
0.030					
			GB81-6	COLLORD	1.5'
0.120					

P	11.15	GB2-7	THURMOND 1413	0.9'	trace
	0.001		HUBBARD		1.0'
			GB81-7	COLLORD	1.0'
	0.004				

Note 4. Described only as "vein material" (Tr. 132). See n.27.
Note 5. Described on Exhibit 97 as "[s]mall pit, vein not exposed."

ADMINISTRATIVE JUDGE IRWIN DISSENTING:

If you step back from this case -- as it is wise to do unless you want to get your hand bitten -- it is apparent that ultimately it is not about whether the Collords could make a profit if they developed a mine on these claims. Rather, from the outset it has been about whether this public land should be used for mining or preserved for wilderness. 1/ Alternatively, it is about whether the United States must compensate the Collords for their claims so the lands are preserved for wilderness rather than developed for mining. These are policy decisions and would appropriately be made by policy makers.

Instead, we are asked to determine whether "minerals have been found and the evidence is of such character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine." Castle v. Womble, 19 L.D. 455, 457 (1894). Since we have been delegated responsibility to make that determination, we have an obligation to do so. But we are not obligated to decide until we have a sound basis for doing so. In my view, although there is an extensive record, we lack the facts needed to make an intelligent decision.

As my colleagues have artfully demonstrated, there is a kaleidoscope of numbers in the record that shows a different pattern depending how it is turned and focussed. We can surmise and suppose, scratch around for facts that suit the surmises, and make some kind of cut-the-baby-in-half decision,

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1/ The Collords are -- or at least were -- well aware of this. In January 1985, they wrote the Forest Service District Ranger:

"I am in receipt of Pete Walker's letter of 9/27/84 concerning access to my Golden Bear Claims. * * * You have outlined the specific type of information required in your correspondence of 9/27/84, and I will respond to your request later in this letter. However, before I do this, I would like to make a few general comments about development of the Golden Bear property. I realize that my plans for road construction and mine development will generate considerable adverse reaction from the segment of the public who are wilderness supporters. Although these people probably will never support mineral development in a designated wilderness, it is my intention to do everything possible, within reason, to make my activities compatible with wilderness management objectives. * * * I can appreciate the rather awkward position of the Forest Service here as it is impossible to settle on provisions for building a road in a classified wilderness which is [sic] entirely satisfactory to both environmental groups and the miner. Any provisions will be, of necessity, a compromise between these two opposing viewpoints."
(Exh. 43 at 1-2).

and the majority has done so. Perhaps the Collords will be relieved that the case is finally over. But it would be fairer to them, and fairer to the public whose land it is, if we made a well-informed decision. For several reasons, we have not.

Perhaps the clearest indication the decision is premature is that after the hearing was held and the Administrative Law Judge made his initial decision, the Collords submitted a report by the Western Field Operations Center, Bureau of Mines, and asked that we take official notice of its contents under 43 CFR 4.24(b). See Memorandum to The Files from R. J. Thompson entitled "Review of the Golden Bear Claim Group, Valley County, Idaho-Frank Church-River of No Return Wilderness," dated Oct. 23, 1990. The lead opinion takes official notice of the report and cites it several times.
The lead opinion says:

> At this stage in the proceedings we would normally consider only whether the hearing should be reopened for the purpose of receiving the report into evidence. See United States v. Whittaker (On Reconsideration), [102 IBLA 162 (1988)] at 164. We are not persuaded to do so. No explanation has been provided for the failure to generate this report prior to or at the time of the hearing, so that it could have been introduced at the hearing. Nor would the report change the result reached by this decision.

(Lead Opinion at 273 n.9).

43 CFR 4.24(a)(1) provides that "[t]he record of a hearing shall consist of the transcript of testimony or summary of testimony and exhibits together with all papers and requests filed in the hearing." 43 CFR 4.24(a)(3) provides:

> Where a hearing has been held in other proceedings [i.e., not "on an appeal pursuant to instructions of an Appeals Board under 43 CFR 4.24(a)(2)], the record made shall be the sole basis for decision except to the extent that official notice may be taken of a fact as provided in paragraph (b) of this section.

Paragraph (b) provides that "[o]fficial notice may be taken of the public records of the Department of the Interior and of any matter of which the courts may take judicial notice."

Even assuming the Bureau of Mines report is a public record of the Department, it is improper for us to take official notice of it. It was submitted by the Collords and the other parties have had no opportunity to rebut it or cross-examine its authors. Taking official notice of it deprives them of this opportunity. "The Department's policy has been that evidence tendered on appeal from a mining contest may not be considered except for the limited purpose of deciding whether there is any justification for ordering a further hearing, since the record made at a hearing must be the sole basis for decision." United States v. MacIver, 20 IBLA 352, 358 (1975).

"There should be a reasonable basis for concluding that a further hearing will be productive of the desired additional information before re-opening the evidentiary proceedings." United States v. Taylor, 19 IBLA 9, 22, 82 I.D. 68, 72 (1975). In this case, the Bureau of Mines report provides a reasonable basis for concluding there is a need for a further hearing. Several of the conclusions of the Bureau of Mines report are contrary to those in the lead opinion.

For example, the Bureau of Mines report states:

> The use, by the U.S. Forest Service, of 232 feet for the depth projection on the Golden Bear vein certainly produces a "minimum" ore reserve from a tonnage point of view. This depth project[ion] figure is based on the perception by the U.S. Forest Service that there are two veins on the Golden Bear claims. * * * Observations by the U.S. Bureau of Mines support the idea of one vein. As such, the vein would have a strike length of between 1,200 and 1,300 feet. The depth project[ion] that could be used based on a strike length of 1,200 or 1,300 [feet] is 600 to 650 feet. The 232 feet used by the U.S. Forest Service is approximately one-third of strike length and reduces by approximately two-thirds the total tonnage and total ounces that could be calculated.

(Bureau of Mines Report at 11). The lead opinion confines the depth to "one-half the length of each of the discrete higher-grade ore bodies since there is no evidence that these bodies extend the entire length of the vein" (Lead Opinion at 275). The lead opinion projects the ore bodies "to depth only to the extent that they can be observed on the surface," i.e.,
to 77.5 feet for the high grade body (one half the total length of three zones of influence) and 86 feet for the medium grade body. The lead opinion states that "this was the approach adopted by Robert C. Sykes, a Forest Service mining geologist," and concludes that "to do otherwise would be
to substitute sheer speculation for reasonable geologic inference." Id. at 276. In view of the Bureau of Mines report, I think this approach is very dubious. 2/

Even using Forest Service reserve estimates and a 5-year mine plan to extract only the ore with an average grade greater than 1 ounce gold/ton ore, the Bureau of Mines report calculates a profitable operation, with a net present value at 15 percent of $211,114, would be possible (Bureau of Mines Report at 15 and Table 5). Mining the additional tonnage with an

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2/ In September 1982 Sykes made a "cursory exam * * * not to determine whether or not a discovery was present [but] only to determine whether or not what Mr. Collord had proposed [to construct a road from the Big Creek Road up Little Ramey Creek] was in reason" (Tr. 433-35; Exh. 16). Based on looking at the vein where it is exposed on the surface and measuring it as accurately as he could at the time, Sykes reported the "visible" length of the vein as 500 feet and therefore calculated depth at 250 feet (Tr. 433; Exh. 16).

average grade of 0.714 ounce gold/ton ore obtained from assuming a single vein was also calculated as profitable over a fifteen year period, with a net present value of $488,891. Id. at 15 and Table 6. This conclusion supports the validity of both Golden Bear claims.

The Bureau of Mines states that the Collords' projected operating costs (for mine/mill maintenance and fuel) appear somewhat low and may need to be adjusted: "[C]ertainly the costs should be reviewed and updated on current estimates" (Bureau of Mines Report at 10). The lead opinion says nothing about the need to update these costs.

The Collords do not have to explain why they did not offer the Bureau of Mines report at the hearing. They did not offer it because it was not available then. See United States v. Hanson, 26 IBLA 300, 302-03 (1976). Nor do they have to justify why the Bureau of Mines did not prepare the report in time for the hearing. Presumably they could not control when it was prepared. The Bureau prepared the report at the request of former Senator McClure. 3/ It is not apparent when the request was made or whether the agency's budget or other commitments precluded preparing it earlier.
We should consider the source of the information offered and its contents in determining whether or not a further hearing is warranted. In this case the source is presumably objective and the contents are directly relevant.

43 CFR 4.452-9 provides that the Board may remand any case for further hearing if it considers that necessary to develop the facts. "In order to have sufficient basis for an informed determination on the issue of discovery, this Department has in some cases * * * remanded cases for further hearing on factual issues." United States v. McKenzie, 20 IBLA 38, 40 (1975). We have done so in United States v. Ideal Cement Co., 5 IBLA 235, 79 I.D. 117 (1972), aff'd, Ideal Basic Industries, Inc. v. Morton, 542 F.2d 1364 (9th Cir. 1976), when we determined "that the stipulated facts will not support a finding that the mining claimants have satisfied the requirements of the mining laws with respect to evidence of present demand and marketability at a profit." 5 IBLA at 245, 79 I.D. at 122. 4/ We did so in United States v. Kosanke Sand Corp. (On Reconsideration), 12 IBLA 282, 80 I.D. 538 (1973), when a majority of the Board concluded, upon re-examination of the record, "that the evidence is insufficient to make a final determination as to the validity of the claims" and gave all parties "a further opportunity to produce evidence on those issues which were insufficiently covered at the first hearing." 12 IBLA at 305,

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3/ The Forest Service's concern about the ethical implications of Senator McClure's involvement is not our business and does not affect the contents of the Bureau of Mines report.

4/ It is still true, as we said in that case, that "[t]he Department of the Interior encourages stipulations in mining contests as well as all other proceedings. If properly drafted, such stipulations alleviate the burdens of all parties, including the Government, and the administrative process
may be expedited and costs mitigated." 5 IBLA at 245, 79 I.D. at 122.

However, the record in this case is "fraught with conjecture, unsupported predictions, and voids," as the stipulations in that case were. 5 IBLA at 243, 79 I.D. at 121.

IBLA 89-332

128 IBLA 365

80 I.D. at 549. In McKenzie, supra, we ordered a third hearing when it appeared the mining claimant was confused about whether evidence tendered at the second hearing was received. We remanded for further hearing in United States v. Pittsburgh Pacific Co., 30 IBLA 388, 84 I.D. 282 (1977), when we concluded that "substantial questions exist with respect to adequacy and cost of water supply, additional land, financing, labor costs, and expense of compliance with environmental protection laws." 30 IBLA at 393, 84 I.D. at 285.

Significantly, these were all patent proceedings, as is this one. Especially in a patent proceeding "it [is] essential to order a further hearing to make a proper determination on the essential issues." United States v. Taylor, supra at 25-26, 82 I.D. at 74; United States of America v. Multiple Use, Inc., 120 IBLA 63, 118 (1991); United States v. Pittsburgh Pacific Co., 68 IBLA 342, 348, 89 I.D. 586, 590 (1982); United States v. Hooker, 48 IBLA 22, 27 (1980). I recognize the Board takes the action of remanding for a further hearing "with reluctance [because] [a]dditional proceedings will entail time and money." United States v. Kosanke Sand Corp. (On Reconsideration), supra at 285, 80 I.D. at 539; see also McKenzie, supra at 45. However, I believe on the present record we cannot make "a proper determination on the essential issues" of the extent of the high and medium-grade reserves, and the methods and costs of mining them.

We are "obliged to determine, with as great a degree of certitude as is possible, whether a discovery of a valuable mineral deposit has been made on these claims." United States v. Kosanke Sand Corp. (On Reconsideration, supra at 285, 80 I.D. at 539-40. Fundamental fairness to all the parties and our responsibility to assure that "valid claims may be recognized, invalid ones eliminated, and the rights of the public preserved," Cameron v. United States, 252 U.S. 450, 459-60 (1920), make it necessary that we remand this case to develop the facts. 5/

There are additional reasons why this record is incomplete. Before the hearing there was no discovery and important witnesses could not be subpoenaed to testify at the hearing. In accordance with a statute enacted 90 years ago, the Department may not subpoena witnesses to attend a hearing more than 100 miles away from the place of service or outside the county in which they were served, nor may it issue subpoenas duces tecum or subpoenas for depositions for discovery purposes. 43 U.S.C. § 102-106 (1988); 43 CFR 4.26(a); 43 CFR 4.423; 43 CFR 4.452-4. See United States v. Robinson,
21 IBLA 363, 388, 82 I.D. 414, 425-26 (1975). In this case the Collords submitted subpoenas for two Forest Service employees they wanted to call as witnesses, citing the authority provided in 43 CFR 4.1121(a)(2) for an Administrative Law Judge to issue subpoenas. That authority is based on section 201(c)(1) of the Surface Mining Control and Reclamation Act of

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5/ "[T]o carry out this duty [stated in Cameron], we must have an adequate record on which to base a decision. It has been recognized that when the record is not sufficient, an administrative agency 'should see the record
is supplemented before it acts.' Isbrandtsen Co. v. United States, 96 F. Supp 883, 892 (1951), aff'd per curiam, 342 U.S. 950 (1952)." United States v. Ideal Cement Co., supra at 245, 79 I.D. at 122.

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1977, 30 U.S.C. § 1211(c)(1) (1988), however, which provides that the Secretary "shall * * * conduct hearings, administer oaths, issue subpenas,
and compel the attendance of witnesses and production of written or printed material * * *."

The Administrative Law Judge did not issue the subpoenas requested by the Collords "because such subpoenas would be powerless to compel the named Forest Service employees to attend a hearing in Boise, Idaho, (assuming they are served at the addresses supplied by [the Collords])," citing 43 U.S.C. § 102 (1988) and 43 CFR 4.26(a). The Administrative Law Judge was limited to suggesting to the Collords that they consider an alternative place for the hearing "in order to take advantage of this office's limited subpoena power," and to exhorting the parties to "cooperate to ensure that all relevant evidence (and testimony of all persons with first hand knowledge of material facts) is presented at the hearing" (Letter to the Parties from Administrative Law Judge John R. Rampton, Jr., dated May 18, 1988).

Ultimately, neither Forest Service employee testified. One of them, Joe Tague, was employed in the Krassel Ranger District in the Payette National Forest, accompanied Carol Thurmond on two visits to the claims, and was directly involved in the discussions with the Collords. The other, Earl Kimball, was the District Ranger of the Krassel Ranger District, and author of the January 1985 memorandum (Exh. 39) to the Forest Supervisor inquiring whether the September 1984 evaluation of the claims by Curtis
and Wallace (Exh. 35) and the October 1982 examination by Sykes (Exh. 16) "give adequate consideration to the sensitive nature of Wilderness and to reasonable alternatives to meet the rights of the claimants." He was also the author of the April 1985 letter to the Collords (Exh. 46A) requesting them to provide several items of information in a comprehensive plan for
the development of the claims and the recipient of the Collords' May 1985 response to his letter (Exh. 47) and of a Collord discussion of what was necessary for the development of the claims in 1986 (Exh. 57). Thus, he was also directly involved in the Forest Service's evaluation of these claims. Both men could doubtless have added substantially to the information needed to appraise the soundness of the Forest Service case but were unavailable. Although discovery procedures can be and often are abused, these abuses can be prevented and sanctioned. Legislation providing Departmental authority commensurate with that of other Federal agencies is long overdue. 6/ In the meantime, every effort should be made to obtain the testimony of essential witnesses.

Further, there was no pre-hearing conference. Although 43 CFR 4.452-1 authorizes an Administrative Law Judge to convene the parties for such a conference to consider the simplification of issues; the necessity of amendments to the pleadings; the possibility of obtaining stipulations, admissions of fact, or agreements on the introduction of documents; the limitation of the number of expert witnesses; and any other matters that may aid in the disposition of the proceedings, and to

6/ See 3 Recommendations and Reports of the Administrative Conference of the United States at 47, 503 n.165 (1974).

issue an order which limits the issues for hearing to those not disposed of by admissions or agreements, no such conference was held in this case. The hearing lasted six days and had to be interrupted for three weeks and reconvened.

The Administrative Conference of the United States has recommended that presiding officers "should promote party agreement and concessions on procedural and substantive issues, as well as on matters involving facts and documents," as a means to "[r]educing the delay, expense and unproductive legal maneuvering found in many adjudications." 1 CFR 305.86-7, Recommendation 6. See also Recommendation 7. The Department is expected to implement these and other recommendations to promote just and efficient administrative adjudications in accordance with section 3 of Executive Order 12778. See 56 FR 55195, 55199 (Oct. 25, 1991). We have held that Administrative Law Judges have authority in a pre-hearing conference order to permit the use of interrogatories and requests for production of documents, so long as they are not backed by the Department's subpoena power, and that the rules and case law derived from the Federal Rules of Civil Procedure-- including sanctions for a party's failure to obey an order compelling discovery -- may serve as guidance in regulating the use of discovery. United States v. Pittsburgh Pacific Co., 68 IBLA at 353, 89 I.D. at 593. We noted that interrogatories have "provided the parties with a useful device to narrow and clarify issues and to ascertain information relevant to the subject matter of complex litigation." Id. at 352, 89 I.D. at 592. Especially in view of the Department's limited subpoena powers, the Administrative Law Judge assigned to conduct the hearing in a mining contest should regularly make use of a pre-hearing conference and such approved procedures to focus the scope of the hearing.

When we refer a case for a hearing, we are supposed to specify the issues upon which it is to be held. 43 CFR 4.415. See United States v. Kosanke Sand Corp. (On Reconsideration), supra at 305-11, 80 I.D. at 549-52. Because of the lack of discovery and because of the lack of pre-hearing definition of issues in this case, it is not until after the hearing that enough is known that we can specify what issues need to be the subject of further fact-finding. We could do so now, and should do so.

The Collords have endured the protracted, expensive, and unpredictable process established to protect their property rights and the public's interests in the public lands. United States v. O'Leary, 63 I.D. 341 (1956). Unfortunately, the "prudent man" standard of the mining law, Castle v. Womble, supra, and United States v. Coleman, 390 U.S. 599 (1968), is hardly precise. Although "objective," the standard is vague enough that doubt and discretion may lead to different applications of it. 7/ Until

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7/ "[T]he Forest Service has noted that the prudent man standard is an objective standard. This observation is correct. The prudent man rule requires the claimant to submit proof that a prudent man would develop a mine. It is not enough that a claimant himself desires to do so if the evidence leads to the conclusion that a prudent man would not." United States v. Foresyth, 100 IBLA 185, 209-10, 94 I.D. 453, 467 (1987).

IBLA 89-332

128 IBLA 368

this standard and this decisionmaking process for obtaining a patented mining claim are reformed, however, the only counsel is patience. In my view, this case is an example of the need for such reform.

I would set aside the Administrative Law Judge's decision and remand the matter for a further hearing after appropriate discovery and a pre-hearing conference.

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Will A. Irwin
Administrative Judge